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Participation of Lay People in the Promotion of a Rural Child Health Program*

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CONDITIONS in the rural field of child health point toward a coöperative program as the only one that can really reach every child. Because the rural territory is large, and the facilities to cover it are small, the limited professional personnel is faced with the overwhelming task of trying to bring a health service to scattered families in isolated districts. Health workers are often under the additional handicaps of inadequate budgets to cover expenditures, and large numbers of children requiring assistance, due not only to the scarcity of medical and dental service, but also to the fact that the poverty of many families makes it impossible for them to provide corrective work.

Child health work is never completed in any community, since each year new children are added to the population, and the health forces must try to keep abreast of a steadily moving procession of children, many of whom live long distances from the health centers. Thus it is that the only possible way adequately to reach these children is to multiply the influence of professional groups by enlisting the coöperation of the people of the local community.

Many procedures which trained workers have formerly believed belonged exclusively within their province, can be done equally well

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by an intelligent lay person (one who has had no specialized training in that particular field). So, in order that the public dollar may go as far as possible, professional workers should ascertain the minimum number of procedures that they must carry on personally, and turn over all others to competent citizens. Then too, lay people have a much greater appreciation of the importance of a service after they have participated in it; therefore, the time spent in educating local leaders is well spent, when measured in terms of increased service to the child.

It is from the community itself, then, that its own greatest good can come, since Mrs. Everybody and Mr. Ordinary are in the majority and can help more than they realize. For example, they can care for the transportation of indigent children to places where various types of health service are available. When physical examinations are being given in a community center; when dental clinics are operating; when a station for immunization has been opened, half the battle for health is won. But only half, for, how are the children who live from 4 to 10 miles from these advantages to derive any benefit from them? With the public health officials working to capacity, the hours spent in conveying children to and from such centers are sacrificed from other professional duties for the children. Then it is that a volunteer transportation service is instituted by some competent citizen who is willing to contribute his or her car and a morning a week to the cause, thus insuring to every child in the district the best health advantages that the community offers.

For the citizen who is eager to help and has no car, there are various other tasks. In districts where there are poverty stricken families, intelligent women can carry on relief programs under the supervision of the child health committee or some social agency, if there is one. They can promote child health by reporting to the authorities all children who should be classed as indigent. They can gather and remake clothing to outfit these children, thus protecting them from possible illness due to exposure.

Many bands of community women have utilized their social gatherings for worthwhile purposes and have contributed labor, and raised the necessary money to support such enterprises as providing undernourished children with milk and cod liver oil, and preparing materials for loan closets, layettes and maternity kits.

All citizens can participate in reporting special cases requiring attention, thus enabling the health authorities to work to greater advantage, because the community itself has become an information bureau. Another indispensable factor is that of publicity. Every

interested parent in a rural district who acquaints the public with the value of child health work is furthering the cause. This enthusiastic and optimistic oral propaganda is far reaching in its effects, and supplements the work of the local newspaper.

Occasionally the small centers come together in a county-wide celebration or assembly (as May Day) and each district interprets to the others its own progress in carrying out the health program. Such an exchange of suggestions is stimulating and helps the local leaders to see their parts in the whole scheme, and to visualize the broad field that the health service offers.

Apart from the average citizens, it is assumed that the county officials and administrators will contribute much to the success of the program. School superintendents arrange for space and time for health procedures, and other officials work shoulder to shoulder with the entire community in the interest of the children.

Then there are the teachers. Their influence is an especially broad one because they have daily contacts with so many children. The resourceful teacher makes a survey of the physical condition of the children and the school environment early in the year, and makes immediate adjustments for special cases and conditions disclosed. She utilizes, as opportunities of teaching, the daily events and problems which arise in the school, thus enabling pupils to coöperate intelligently in the prevention and care of colds, epidemics and accidents. She seeks to combat undernourishment in children by instituting hot lunches, and she endeavors to instil in each child the desire to be in as perfect a physical condition as is possible.

In her contacts with the parents, the teacher often educates them in special phases of the school health program such as physical examinations and immunity treatments. For the protection of the community, the teacher reports any signs of departure from normal health which may appear in the classroom from day to day. She can often give valuable information regarding the particular needs of certain children, and her word carries weight in an interview with the county officials in the interest of special cases. The alert, interested teacher can in these and in innumerable other ways interpret the health service to the entire district and help it to function efficiently.

These are some of the ways in which officials, teachers, and citizens can work together in the common cause. The extent to which lay people actually participate in the program depends upon a variety of factors, some of which are inherent in the community, and some of which may be developed. A neighborly interest, with a

desire to be of service to others, is latent in almost every district. It manifests itself readily in times of disaster, because the emotions are involved; but in the everyday occurrences in the community, the citizens are inclined to be casual until some threatened danger brings matters to a crisis. This driving force which is so potent in time of stress and strain should be called into action when there are less dramatic situations demanding help. When people are brought to realize fully that undernourished children who are in their midst continually are literally starving, or that those who are laboring under various handicaps of vision or hearing, are really suffering, they will work together with the same neighborliness and sympathy which they exert under more dramatic circumstances.

A friendly spirit built up between the health workers and the people is absolutely essential, and both should feel that they are coworkers in a common cause, and realize that the success of one is very much dependent upon the assistance of the other.

An organization for work is another prerequisite, and it should reach even the most remote rural areas. Potential executive ability in the community should be recognized in this organization, and increasingly given new responsibilities for the management of selected projects. The professional group too must have good leadership if things are to be accomplished. A good leader must be able to define aims clearly, to point out the best road leading to the community's goal, and he must be able to select and to detail many responsibilities to others. The contributors must see their parts in the realization of the end result, and feel that their participation has been worthwhile and is appreciated.

Finally, the professional group should give generous recognition to the lay service; in speeches or messages the officials should avoid the personal pronoun " I," and in discussing accomplishments should say " we " or " they " (the lay people) " have done these things." Newspaper articles and official reports should keep the spotlight on the people whenever possible in order that the public may realize that it is absolutely indispensable in the program. In this way, the citizens will be brought to realize that they hold in their hands the physical condition of their own and their neighbor's children, and that with the proper spirit of coöperation and coördination among themselves and with the authorities, the possibilities are infinite for insuring a high degree of health for the maximum number of children.

Some of these " infinite possibilities " are being realized, and in isolated districts where one might least expect to find a coöperative interest in health. For example, there is Pumpkin Creek's loan closet

which became a checking account for the community. It is not the sort of an account on which checks are drawn, nor are its benefits to be reckoned in dollars and cents. Somebody in Pumpkin Creek decided that illness is an emergency which finds most people unprepared; so the women held bazaars, church suppers, and apron sales, and from the proceeds purchased the sick room supplies which are difficult for the average family in the outlying district to obtain. And now, when there is illness, the patient is made as comfortable as possible with clean linens on the bed, and equipment at hand for the necessary treatment. When the invalid recovers, the materials are washed and put away until the next emergency arises. So, although the checking account does not handle capital it does pay 100 per cent in community interest.

Sleepy Hollow has done its share, too. The people are as poverty stricken as the proverbial church mice, and when the rumor came that a dentist had arrived at a neighboring center, and that he was willing to do dental work for those who could not possibly afford to pay for it, there was a community-wide consultation about ways and means. Every parent wanted his child's teeth cared for, but a 20-mile walk was out of the question, and the whole district boasted only one car, if it could be called such. The vehicle was a model T Ford which had long since passed its 15th birthday. One woman, a courageous soul, volunteered to engineer the thing if the wherewithal for gas could be obtained. And it was—pennies—a nickel occasionally—an even more infrequent dime (dollars were unheard of in Sleepy Hollow), and finally the contributions were collected. The "limousine" was packed to the top with assorted children of every age and size, and bounced merrily off upon its way. So were the youngsters introduced to their first dentist, and when they rattled back to their homes at night with missing teeth, and the busy hum of the drill still ringing in their ears, each was the proud possessor of a tooth brush, and the day, to Sleepy Hollow, was a red-letter one, not to be quickly forgotten.

Still another community instituted a different type of service. Health work in this particularly isolated district in the northernmost point of Michigan is as yet a pioneer. The nurse is forced to confine her attentions pretty largely to the school children, since the roads are impassible for a large part of the year, and the families are widely scattered. So it was decided that since she could not possibly reach the preschool children, they would come to her. Accordingly, the school turned itself into a combined nursery and clinic, and gave a "party" for 25 little folk, from 1 year to 5, who came with their

mothers for their first visit to the school. The toddlers were given a complete health examination; luncheon consisting of orange juice and animal crackers was served for them; and the mothers were advised as to the proper food and care of preschool children. The adventure was an unqualified success, and has become an annual event that these children may be kept healthy and fine until they are added to the school population.

In a poverty stricken consolidated district the school principal was appalled by the high percentage of children who were undernourished. Many of them were actually hungry, because the meager little farms on which they lived had gone to seed, and the depression had made it impossible for their farmer fathers to realize any profits on their products. The principal decided that it was the school's responsibility to see that every child had at least one good meal every day. Accordingly, he had a canvass made of the entire district, each home checking the farm produce which it could contribute to a hot lunch for the children. On the basis of this, he worked out a schedule for meals costing 3 cents apiece, and for the entire year 285 children had a hot meal every day. The home economics girls did the work and 95 per cent of the homes coöperated with donations of potatoes, milk, turnips, carrots, and beets. All of the children gained noticeably and the parents were delighted. When the principal sent around a questionnaire to see whether the district wished to continue "feeding the small army" the following year, every reply was an enthusiastic affirmative, and one mother wrote delightedly: "By all means! All of the children are fatter, especially Beulah!"

So we see that the "learning by doing" theory in education, which is coming to be generally accepted in childhood education, is thus beginning to be recognized as equally valuable in educating adults to the problems about them and how to solve them most effectively.

These, then, are the actual by-products of coöperative enterprises, and in terms of child health their value is inestimable. Small armies are fed; the toddlers are inspected, and a checking account is opened in the community. And in every case the district shows a marked improvement; the general community is healthier, and the layman learns that he does not need specialized training to contribute his share.

If, all over the rural areas, citizens could join hands in such a way with health departments, both would be doubly strong and their combined forces could accomplish the hitherto impossible feat of bringing maximum health to every boy and girl in the remotest districts.

H and O Agglutination as an Aid to the Diagnosis of Typhoid Fever

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DURING the past year we have determined the H and O titers of 161 serums, using formalinized and alcoholized suspensions of *B. typhosus*, for the purpose of evaluating such a procedure in the diagnosis of typhoid fever. These serums represent 41 cases of clinical typhoid, 30 patients suffering from febrile, non-typhoid diseases, and 90 healthy vaccinated (antityphoid) individuals. The results of these titrations are presented in Tables I and II.

According to Felix,[1] most typhoid infections produce both H and O agglutinins—the H (flagellar) designating the infecting organism, and the O (somatic) expressing the body's response to infection. In the course of typhoid fever resulting in recovery, Felix demonstrated a marked development of O agglutinins early in the disease. Overwhelming infections would not permit the body to produce O agglutinins and, on the other hand, very slight infections would not offer sufficient stimulation for the development of O agglutinins to any appreciable titer. Thus the demonstration of small flaking O agglutinins in a suitable dilution of serum (1:100–1:200) has diagnostic value and, in addition, offers some prognostic information since Felix and Olitzki [2] regard the O agglutinin as identical with the bactericidal antibody. In vaccination only large flaking (H) agglutinins are produced. A vaccinated person suffering from some non-typhoid disease may show a stimulation of H agglutinins (anamnestic reaction), but O agglutination is only given in the course of infection with a member of the enteric group of organisms.

Felix's demonstration of high titers of O agglutinins in typhoid infections has been confirmed by Stuart and Krikorian,[3] Gardner,[4] Ecker and O'Neal,[5] Mudd,[6] and workers in this laboratory.[7, 8] Stuart and Krikorian also agree with him as to the lack of O agglutinins in vaccination. All other data, however, substantiate Gardner's claims that vaccination produces O agglutinins to a degree worthy of notice.

Mudd demonstrated a definite correlation between the protective power of a T.A.B. vaccine and its ability to stimulate the development of somatic agglutinins. Gardner recommends the use of higher serum dilutions (1:400) than those used by Felix to insure the diagnostic value of O agglutination.

PROCEDURE

Serums—Blood was drawn from febrile patients as soon after admission to the Memphis General Hospital as was possible. When the clinical and laboratory findings designated typhoid fever subsequent specimens of blood were taken at intervals depending on the condition of the patient and the duration of stay in the hospital. It was hoped that repeated titrations would show a relative increase in the development of H and O agglutinins. Since this hospital does not see many early cases of typhoid we were not able to demonstrate any very significant fluctuation of agglutinins, and only the results of the first titration are considered here. The 30 serums from patients suffering from non-typhoid febrile diseases serve as controls for the patients with proved typhoid. Serums for the study of the agglutination reaction in vaccination were obtained from students of the class in medical bacteriology.

Antigens—A 0.1 per cent formalinized antigen as recommended by Dreyer,[3] and an alcoholized antigen prepared according to Gardner's [4] method were employed for the tests reported here. A strain of typhoid isolated from the blood stream of a patient 6 months previously, and conforming to all requirements of a smooth motile form was used in the preparation of the antigens. Recently we have found

TABLE I

SHOWING H AND O TITERS OBTAINED WITH 161 SERUMS FROM VARIOUS SOURCES

Number of Serums	Source	Type of Agglutination	Number of Serums Giving Titers Indicated								
			Neg.	40	80	160	320	640	1,280	2,560	5,120
41	Typhoid Patients	H	1	1	2	6	5	11	8	3	4
		O	1		2	2	1	8	13	9	5
30	Non-Typhoid Febrile Diseases	H	15	8	5	2					
		O	19	4		4	3				
90	Vaccinated Individuals	H	8	2	8	18	21	9	18	6	
		O	17	21	29	18	5				

that 1 per cent formalinized antigens are better for detecting H agglutination than those containing lower proportions of formalin. Formalin 0.1 per cent does not entirely inhibit O agglutination and it is felt that some of our agglutinations in high dilutions of serums with formalinized antigen may in reality be O agglutination, which was not inhibited by the formalin concentration employed.

Technic—Macroscopic agglutinations were set up with serum dilutions ranging from 1:20 to 1:2,560. The antigen-serum mixtures (0.5 c.c. each) were incubated in a water bath at 52° C. The H agglutinations were read after 2 hours, the O at the end of 24 hours in the water bath and again after 24 hours in the refrigerator. Final readings were made by lamplight and with the aid of a hand lens.

RESULTS

As shown in Tables I and II, there is a marked development of both H and O agglutinins in most cases of typhoid fever. The results obtained in other febrile diseases offer a marked contrast. In vaccination H agglutinins are stimulated to high titers, but O agglutinins were present in 81 per cent of the serums tested.

TABLE II

SUMMARY OF H AND O AGGLUTINATION IN 161 SERUMS STUDIED

Serums from Typhoid Patients

Per cent of Serums	Agglutination
2	Neither H nor O agglutination
98	Both H and O agglutination
59	Higher O than H agglutination
12	Higher H than O agglutination
27	Approximately equal H and O agglutination
87.5	O agglutination exceeding 1–500

Serums from Non-typhoid Febrile Patients with no History of Vaccination

Per cent of Serums	Agglutination
0	O agglutination to 1–500
23	O agglutination exceeding 1–100

Serums from Vaccinated Individuals

Per cent of Serums	Agglutination
91	H agglutination 1–40 or over
81	O agglutination 1–40 or over
26	O agglutination exceeding 1–100
0	O agglutination to 1–500

The relationship of O agglutination to infection seems definite, but the titers of 1:100 and 1:200 as suggested by Felix are not sufficiently high to be specific since the 1:100 titer was exceeded by

23 per cent in the non-typhoid group and in 26 per cent of vaccinated subjects.

It will be seen that 87.5 per cent of the typhoid patients agglutinated the O antigen in serum dilutions of 1–500 and such a dilution might arbitrarily be accepted as indicative of infection regardless of vaccine history.

The ease of preparation of antigens and their stability recommends H and O agglutination as a laboratory procedure in the diagnosis of typhoid fever, although it could never have the validity of the isolation of the causative organism.

CONCLUSIONS

1. Both H and O agglutinins are produced in typhoid fever.
2. O agglutination in high titers (1–500 or greater) is very suggestive of typhoid infection.
3. Lower titers do not rule out O agglutination due to related infections or vaccination.

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Care of the Feet

ALL workers in factories where there is a medical department should be given an opportunity to examine a skeleton of the foot which at the same time should be explained to them. This would prevent much misuse of the foot, improper shoes, etc. In particular, fatigue reduction would follow.

A discussion is presented on the general principles of standing, production of falling arches, varicose veins, the proper gait, the value of the foot bath, and description of so-called corrective exercises which can be carried out at nights.—May R. Mayers, *Indust. Bull.*, New York Dept. of Labor, Albany, 11, 7:226, 237 (Apr.), 1932. E. R. H.

Significance of Infant Mortality Data in Appraisal of an Urban Community*

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THE records of 1915 put the infant mortality rate of the United States registration area at 99.9 per 1,000 live births. For that year Denver made respectable comparison, with an infant death rate of 91.3.

Since that time Denver has furnished impressive examples of civic consciousness and growth. It has expanded its hospital and sanitary facilities; converted its public dumping grounds into parks and boulevards; completed a Civic Center widely celebrated; and erected palatial school buildings to excite the admiration of visiting school administrators.

Nevertheless, from 1915 to 1928 the registration area of the United States as a whole had been achieving consistent improvement in its infant mortality rate until the figure had been brought down below 70 per 1,000. The death rate of the 25 largest cities of the country now stood at 66.5; Seattle and Portland led the march of progress with a rate of 43. At the bottom of the list was Denver; her infant death rate in 1928 was still at 91, where it had been in 1915.

The infant mortality study in Denver may be construed as an effort to solve the paradox of a city noted for its beauty, cleanliness, and civic pride, suffering an infant death rate higher than that of any other American city of its class.

Those responsible for the investigation recognized that there would be little justification for the undertaking if it were just another tabulation of general causes of infant mortality. What was required was an analysis of the community, as comprehensive as practicable, which might help to uncover those factors in Denver's infant mortality problem that were amenable to preventive measures or improvement. The composition of the population, the housing conditions, and the sanitary facilities of each district were to be studied for their bearing on infant mortality. A questionnaire, evolved after consultation with physicians, nurses, and health officers, and a month's trial in the

* Read at the Third Annual Meeting of the Western Branch American Public Health Association, at Denver, Colo., June 9, 1932.

field, reflects the effort to obtain an adequate basis for significant conclusions.

The study embraces every live birth and stillbirth in the city of Denver during the 12 months ending February 28, 1931, and each infant death within that group of live births. The total of the live births was 5,330; of stillbirths 180, of infant deaths 410, of maternal deaths 41. The stillbirth rate was 33.8 per 1,000 live births. The mortality rate on the live births was 77 per 1,000 live births.

Of the deliveries in Denver during the 12 months 895 were non-Denver cases, 16.8 per cent of the total. Deaths may have occurred within this out-of-town group during the infancy year; some of these, of course, would not be tracked down by our study. We are reasonably certain that we have all deaths which occurred among the out-of-town cases within 2 weeks after birth—33. The Denver resident deaths during the first 2 weeks were 179, against a total of 350 infant deaths for the year. Assuming, between the 2-week and the annual figures, the same proportion among the out-of-town cases as we have for the resident group, we estimate the number of infant deaths for the out-of-town group during the year to be 65, giving them a mortality rate of 73 per 1,000. Before the year was over we actually obtained information on 55 deaths from this group, leaving us 10 short of our estimated quota. The resident cases showed an infant death rate of 80 per 1,000.

Denver's apparent infant mortality rate, for births within the period of our study, is 87; the higher "official" figure is due to the intake by the Health Department of 55 death certificates of babies that died in Denver but were not born there.* This intake is an excess of 45 over the number of additional deaths that our estimate would require against the out-of-town cases that were delivered in Denver, and would hardly be considered within the purview of any general efforts to reduce Denver's infant mortality.

The interrelations developed among 5,500 questionnaires, each containing 150 items of medical and social data, are evidently beyond the scope of a 30-minute discussion. This paper has been confined, therefore, to some data on the distribution of significant general factors among the districts and distinctive groups of the city. The objective is to illustrate how the infant mortality problem reflects the social and economic conditions of the community.

In Figure I we see the 33 districts into which the city is divided for social service purposes. The black areas represent the districts

* The number of death certificates received by the Health Department on cases not delivered in Denver, 55, happens to be the same as the number of Denver death certificates on the out-of-town cases delivered in Denver and included in the study. But the two items are distinct.

in which the infant mortality rate was 100 per 1,000 or over. The dark cross-hatched areas show the districts with infant mortality rates ranging from 75 to 100; the light cross-hatched lines are used for the districts with rates from 50 to 75, while the lightly stippled areas are the banner districts, having less than 50 infant deaths per 1,000 live births. The map is based on the data in Table I, giving the distribution of infant mortality by districts.

It will be seen that wide differences exist in the infant mortality of Denver's various districts, ranging from 24 per 1,000 in District A to 210 in District K; 21 districts show a mortality above the average. A composite of the 5 best districts gives them 18 deaths out of 566 live births, or a rate of 32 per 1,000. The 5 most unfavorable districts give 101 deaths out of 532 live births, a rate of 190 per 1,000. The black districts form a continuous area in the "bottoms" along the Platte River. Paralleling this area are the railroad yards; overhead are viaducts which carry traffic between the east and west sides of Denver. It is this part of the city in which incomes are lowest, poor shacks predominate, sewers are lacking, toilet facilities are

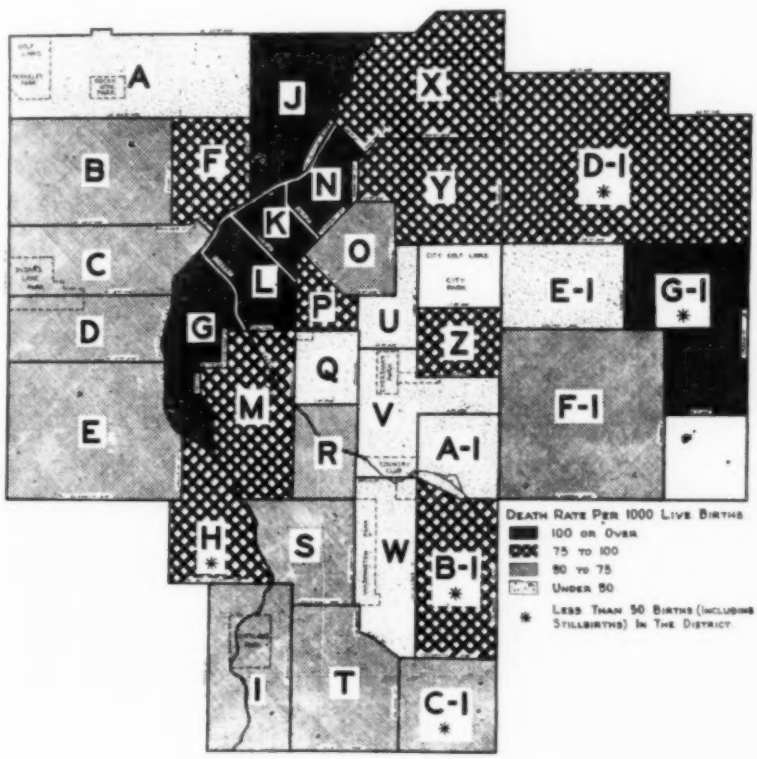


FIGURE I—INFANT DEATH RATE BY DISTRICTS

TABLE I

DEATH RATES BY DISTRICTS

District	No. of live births	Infant deaths Number	Infant deaths Rate per 1,000 live births	District	No. of live births	Infant deaths Number	Infant deaths Rate per 1,000 live births
A	167	4	24	V	134	6	45
B	291	18	62	W	104	4	38
C	109	8	73	X	86	7	81
D	154	9	58	Y	209	16	77
E	188	11	59	Z	119	11	92
F	238	18	76	A-1	50	2	40
G	172	35	203	B-1	36	3	83
H	35	3	86	C-1	33	2	61
I	51	3	59	D-1	24	2	83
J	123	13	106	E-1	103	3	29
K	100	21	210	F-1	49	3	61
L	72	13	181	G-1	39	5	128
M	403	31	77				
N	149	27	181	Total	4,371	350	80
O	208	15	72				
P	150	13	87	Denver unclassified	25	3	120
Q	142	5	35	Out-of-town cases	895	55	61
R	130	9	69	Not reported	39	2	51
S	172	12	70	Total	959	60	63
T	219	13	59				
U	112	5	45	Grand Total	5,330	410	77

primitive, and the highest percentage of unemployment exists. It is an area largely unknown to the residents "on the hill," who have comfortably held to the assumption that Denver is a city without slums.

HOUSING

In a study made for the Denver Real Estate Exchange in 1930* data were obtained concerning the number of those living units in the city appraised by the municipality at less than $200. Figure II indicates the location of these shacks throughout the city. The shacks—those constructed prior to 1901—are shown by solid black dots, each dot representing ten such units. The circles represent homes appraised at less than $200 which are of more recent construction and in a better state of repair.

Again we find our submerged district along the Platte River, with a predominance of old shacks in the region that showed the highest death rate. The greatest concentration of old shacks is found in District G—224 in number. A tour of the district reveals several

* See *Real Estate Inventory and Market Survey of the City and County of Denver, Colorado, as of September,* 1930 published by the University of Denver Bureau of Business and Social Research for the Denver Real Estate Exchange.

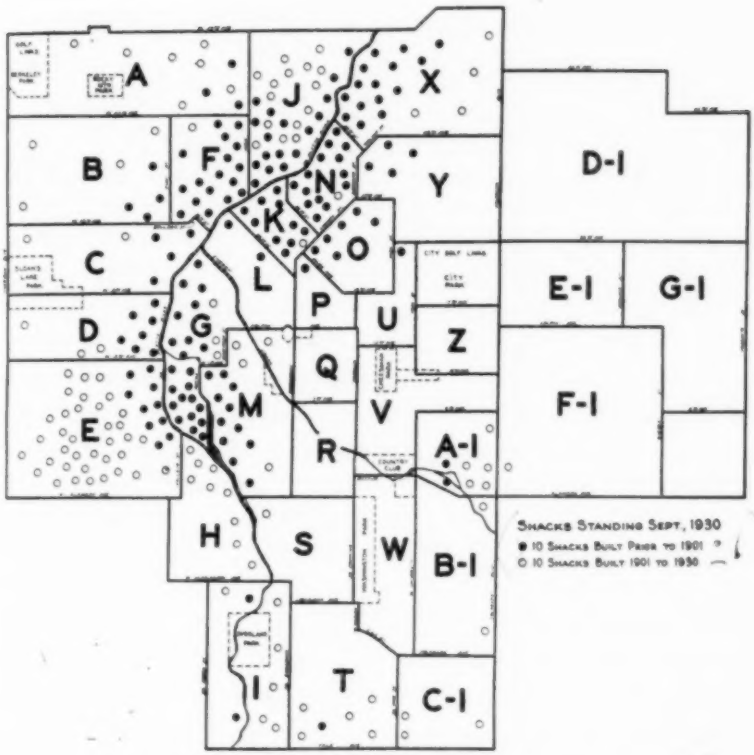


FIGURE II—LOCATION OF SHACK-HOUSING, SEPTEMBER, 1930.

DOTTED LINES INDICATE PARK AREAS.

hundred shacks of somewhat more recent origin which are hardly more fit for habitation than are the older 1-room dwellings. Indeed it has been found that 86.2 per cent of all the homes in District G, 90.8 per cent of those in District N, and 89.1 per cent of those in District K were built prior to 1901.

The division of the homes of nominal appraisal into those of newer and older construction, respectively, sheds some light on the apparent paradox that District E, adjoining the Platte River on the northeast, had a death rate of only 59 per 1,000. In general, the houses of low appraisal in this district are away from the river bottoms; they represent modest homes built on large plots of ground, frequently constructed by the residents themselves. It is a district of permanent residents who have purchased their inexpensive lots, in contrast to the shifting population of the congested shacks in the 5 districts along the "bottoms."

The 5 districts which showed the lowest infant death rate contain 182 out of 2,713 shacks for the city as a whole, 6.7 per cent of the total.

ANNUAL RATE VERSUS EARLY INFANCY RATE

The 1930 infant mortality data for the country as a whole have not yet been released; but if we compare the 1929 United States infant mortality rate of 67.6 with the Denver rate of 77 per 1,000, and then compare the corresponding 24-hour death rate of the nation, which was 15.3, with Denver's, 26 per 1,000, we realize that the city of Denver has an unduly large percentage of deaths under 1 day, as compared with its annual rate. Where the United States rate for the first 24 hours was 22.6 per cent of the total mortality for the year, Denver's 24-hour rate was 31.3 per cent of its annual infant death rate. This suggests the desirability of a careful medical analysis of local practice in deliveries.*

There is a striking contrast between the relative importance of the early infancy mortality in the poor sections, and that of the better districts of the city. If we consider the 5 districts along the Platte River, which account for the greatest number of infant deaths, we find that only 21 of their 109 occurred during the first 24 hours. Their 24-hour death rate was less than one-fifth of their yearly rate. When we take the 5 most favorable districts of the city, with a total of 23 deaths, we have 12 of them within the first 24 hours: *i.e.*, more than one-half of the infant mortality in these 5 best districts occurred during the first 24 hours. The favorable districts suffered slight loss among the babies that lived past the first 24 hours; the poor districts had the preponderance of their losses as the year advanced.

RACIAL FACTORS

The bulk of Denver's negro population is in District O, which accounted for 65 of the 91 negro live births in the entire city. Here a noteworthy record has been made, with only 1 negro infant death among the 65 deliveries, a rate of 15 per 1,000. The infant mortality rate for all of Denver's negro births was 63 per 1,000. By way of accounting for the few deaths among the colored cases in District O, two suggestions occur: an infant welfare station of the Visiting Nurse Association is located in the negro section, open to all women in the district; there were 138 white births in District O, as against 65 negro births, but the records of the welfare station indicate that 80 per cent of the expectant mothers availing themselves of the facilities for prenatal care were negroes. They enjoy, for the most part, favorable housing conditions, occupying homes in a section that used to be tenanted by the upper middle class of the white population, before the whites gave way to the influx of negroes into the district.

* The obstetrical data on this phase of our study have not yet been fully broken down; they are now in process of analysis.

The antithesis of the negro situation is furnished by the high infant mortality record of the Spanish-speaking, usually referred to as the Mexican, population. The aggregate of Mexican births for the 12-month period was 294, of which 277 were assignable to definite districts. Of this group there were 185, about two-thirds of the total Mexican births, in districts F, G, K, and N. In this area the composite Mexican infant mortality rate was 232, nearly treble the rate of 81.7 for the non-Mexican population. For all Mexican live births in the city the infant death rate was 206. The Mexican stillbirths were likewise out of line, with 61 per 1,000 live births. Though the Mexicans constitute approximately 3 per cent of the Denver population, they furnished 6 per cent of the city's total births, and they accounted for 14 per cent of the infant deaths. It is obvious, therefore, that in any effective campaign to reduce Denver's infant death rate, particular attention will have to be given to the Mexican sections.

FAMILY INCOME

That there is a progressive concentration of infant mortality in the poorer districts as the year advances, seems to be borne out in the consideration of infant deaths by income levels. If we separate the 2-week record from the data for the balance of the year, at the various income levels, we have the picture shown in Table II.

Clearly the trend is a closing-in of the gap between the 2 weeks' mortality and the yearly mortality, as we go from the lower to the higher income levels. In the lowest income group, the loss after the second week is more than twice that of the first fortnight. In the highest income class, the additional deaths after the first 2 weeks represent only 11.1 per cent of the yearly mortality.

The income data appear to confirm, on the whole, the familiar tendency for infant mortality to increase with the decline in income levels. This is especially true as we approach the lowest levels of self-support. For that section of Denver's population having family incomes under $500, the infant mortality rate is 186 per 1,000 live births. (This high rate is obtained despite the fact that the class in question includes the charitable cases, in the group under $250, which with the aid of public medical care and public relief manages to hold its infant mortality rate at 72.) For the income class of $3,000 and over, the infant death rate is only 25 per 1,000 (see Table III).

In the breakdown of income levels by districts, we come upon a low income area which comprises the same districts that stood out in Figure I as having the highest infant death rate in the city. Every

TABLE II

Income	Number of infant deaths	Infant death rate per 1,000 live births
Under $500		
Under 2 weeks	14	51
2 weeks to 1 year	34	125
Total	48	176
$500 and under $1,000		
Under 2 weeks	31	37
2 weeks to 1 year	49	59
Total	80	96
$1,000 and under $1,500		
Under 2 weeks	47	43
2 weeks to 1 year	31	28
Total	78	71
$1,500 and under $2,000		
Under 2 weeks	22	28
2 weeks to 1 year	23	29
Total	45	57
$2,000 and under $2,500		
Under 2 weeks	11	27
2 weeks to 1 year	7	17
Total	18	44
$2,500 and under $3,000		
Under 2 weeks	8	33
2 weeks to 1 year	4	16
Total	12	49
$3,000 and above		
Under 2 weeks	8	22
2 weeks to 1 year	1	3
Total	9	25
All income groups (including Not Reported)		
Under 2 weeks	216	41
2 weeks to 1 year	188	35
Total	404	76

district with a death rate of 50 or less is in the income level above $1,500. From there on such factors as the *para** of the child, age of the mother, etc., have been found to modify the relationship between income and infant mortality.

BIRTH RATES

Our data on incomes and birth rates do not correlate consistently with infant mortality in all districts. An accurate census of the population by districts is not available, but we know the number of living units in each district as of 1930,† and may therefore offer some rough comparisons on that basis. The 3 districts of highest infant mortality were Districts G 203, K 210, and N 181. These in turn

* By the term *para* the offspring of a given mother are distinguished. Para No. 1, for example, is the first "life" created in the mother's womb; para No. 2 is the second, and so on. For this purpose, abortions, stillbirths, and live births are counted. In the case of multiple births, a number is given to each of the offspring in the order of its birth. In other studies of infant mortality, notably the recent British study "On the Relative Value of the Factors which Influence Infant Welfare" (University of London, Eugenics Laboratory Memoirs, XXV), the numerical order of the infant is referred to as *place in the family*. That expression, however, has social implications which might exclude the illegitimate births, or the offspring of a previous marriage that have no place in the present family. It has seemed more feasible, as well as convenient, to express the desired meaning, in the present manuscript and tables, by using simply the term *para*.

† University of Denver Bureau of Business and Social Research, *op. cit.*

TABLE III

INFANT MORTALITY AND AVERAGE PARA BY INCOME GROUPS

Annual family income	Number of Live births	Deaths	Death rate per 1,000 live births	Average para
Under $250 *	56	4	72	4.12
$250 to $ 500	218	44	202	3.71
500 to 750	398	40	101	3.18
750 to 1,000	440	40	91	2.96
1,000 to 1,250	767	58	76	2.70
1,250 to 1,500	337	20	59	2.60
1,500 to 2,000	790	45	57	2.42
2,000 to 2,500	408	18	44	2.22
2,500 to 3,000	247	12	49	2.36
3,000 or more	363	9	25	2.39
Not reported	1,306	120	92	2.04 †
All incomes	5,330	410	77	2.54

* Charity cases included.
† Based upon 1,173 cases only, since para information was lacking on 133 cases in this group.

show the highest number of births relative to living units, as follows: District G—172 births in 1,336 living units, District K—100 in 877, and District N—149 in 1,575. Combining these 3 districts we get 111 births per 1,000 living units, by far the highest birth rates for any 3 districts in the city. These are at the same time the ones which rank lowest in average income.

Against these we have a contrast in the 3 residence districts of lowest birth rates, namely, Districts Q, U, and E–1, with a composite birth rate of 37 per 1,000 living units. Their infant mortality rates are third, sixth, and second, respectively, from the lowest. In income they rank third, fourth, and second, respectively.*

An unmistakable tendency in our data is for the higher income classes to show low birth rates and *vice versa*. This will be evident from a glance at Table III, which gives the average *para* of the births at each income level. When we break down the infant mortality record by the para of the child we find little difference in infant mortality rates for paras 1 to 5. But a sharp rise in the death rate occurs from para 5 on. The average death rate for paras 1 to 4 inclusive, is 67 per 1,000 live births, while for paras 5 and over we have an infant mortality record of 143 per 1,000 live births. The infant mortality rate for each para is shown below. As to the general relation of

* It does not follow, however, that we have no examples of large families and moderate incomes going hand in hand with low mortality. The most striking case in point is that of District A, with a birth rate of 64 per 1,000 living units and a median income level only a little above $1,500, leading the districts with an infant mortality of only 24. It is a district free from congestion, containing two of the city's largest parks, and detached homes of established residents at an almost uniformly middle-class level. On the other hand, we have District Z quite out of line in the other direction, with 11 deaths in 119 live births for an infant death rate of 92, although its birth rate is only 43, and its district income is fifth from the highest.

infant death rates to birth rates and income, a permissible conclusion is that high para and low income, when found together, mean a high infant mortality.

TABLE IV

INFANT MORTALITY IN DENVER CLASSIFIED BY PARA
(Denver residents only)

Para	*Live births*	*Deaths*	*Infant mortality rate*
1	1,623	104	64
2	1,047	69	66
3	640	46	72
4	363	26	72
5	249	28	112
6	148	24	162
7	101	14	139
8	54	8	148
9	50	11	220
10 or more	71	11	155
Not reported	25	9	360
Total or average	4,371	350	80

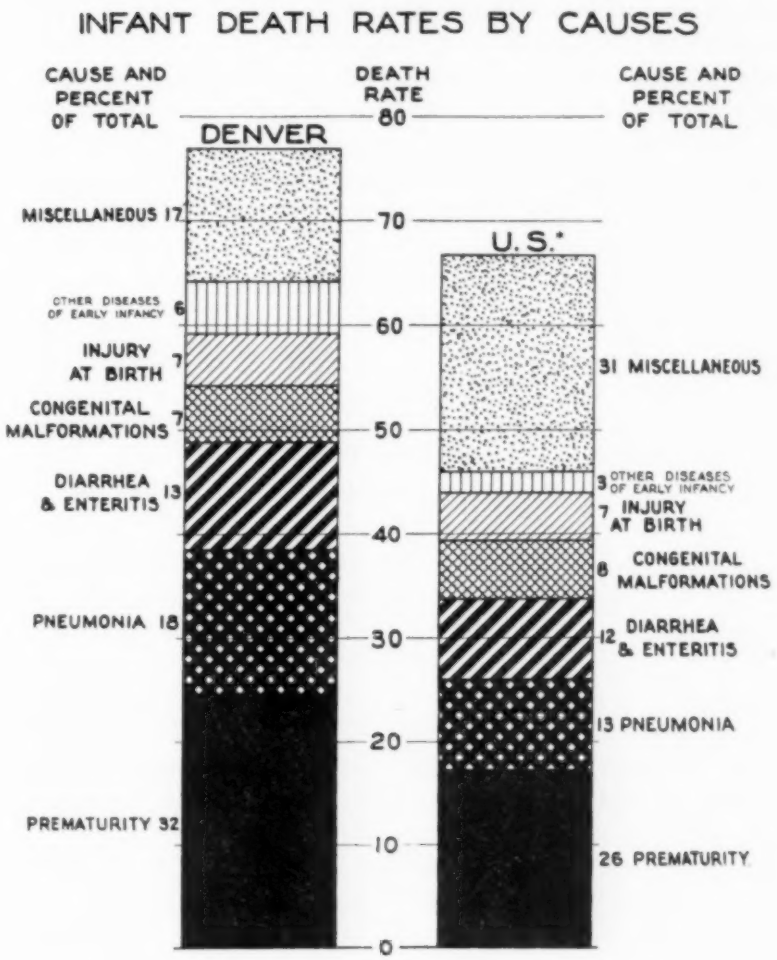
CAUSES OF DEATH

The ranking of the leading causes of death is the same for Denver's cases as it is for the United States, as may be seen in Figure III. Three items, however, command attention. The first is the relatively high incidence of prematurity in Denver, constituting 32.2 per cent of the infant deaths. The prematurity death rate for Denver is 24.6 per 1,000 live births, against 17.4 (1927–1928 average) for the country as a whole.* The second feature to command our interest is the record on pneumonia and other respiratory diseases. Denver's infant deaths from pneumonia account for 18 per cent of the total infant mortality, while for the United States the incidence of pneumonia is 13 per cent. Expressed as rates, Denver's infant mortality from pneumonia is 14 per 1,000 live births, while for the country at large it has been 8.9 (1927–1928 average). In connection

* In discussing this paper at the western meeting of the A.P.H.A. Dr. John W. Amesse made pointed reference to the prevalence of prematurity on Denver death certificates, as follows: "The term 'prematurity' often appears as the last resort of the careless, untrained accoucheur, hurried (or harried) into a diagnosis by some distracted parent or insistent funeral director. As a matter of fact we may well doubt the accuracy of such a decision in many of these cases; it is entirely conceivable that many of these deaths are due to birth injury, such as intracranial, pulmonary or gastrointestinal hemorrhage which a few moments of intelligent investigation would reveal. Even with post-mortem examination refused (as it usually is) lumbar, ventricular or cisterna puncture will often clear the situation immediately. The fact, developed by Dr. Earp and me in conference with physicians on this matter, that practically all diagnoses of prematurity have been made by poorly trained obstetricians not attached to our teaching hospitals is illuminating. In any event, in spite of the obvious weakness in our Nomenclature of Disease, if the term prematurity or immaturity is used, it should, on occasion, be qualified. One could say, for example, 'death from prematurity, by reason of multiple pregnancy, from nephritis, heart disease, exophthalmic goiter, diabetes, pneumonia, tuberculosis, etc.,' in the mother. If in doubt, he can always turn the case over to the coroner's physician.

"It is obvious that with nearly 50 per cent increase in mortality during these early weeks of life we cannot hope in Denver to bring our ratio to any fair approximation with those of comparable cities in the United States."

FIGURE III



with the records on diarrhea and enteritis the relative importance of these factors for Denver generally is seen to be in line with that of the nation.

Among the Spanish speaking population of the city diarrhea and enteritis rank as a first cause of infant mortality, with 34 per cent of all the Mexican infant deaths due to this cause. The pneumonia mortality likewise falls most heavily on the Mexican group, accounting for 33 per cent of all the infant deaths. In other words, these two causes combined account for two-thirds of all the Mexican mortality in Denver. In view of the fact that this group occupies the poorest housing section of the city there seems to be room for a pointed inference in the case of the Mexicans regarding the relation between poor housing and sanitary conditions and high infant mor-

tality. An unexpected finding of the study is the infrequency of tuberculosis as a cause of infant mortality, with 1 case in 410 deaths. The United States census for 1928 showed 1,227 infant deaths due to tuberculosis, equivalent to 8 of every 1,000. The fact that tuberculosis as a cause of infant deaths thus ranked lower for Denver than for the United States registration area as a whole, is contrary to the commonly held assumption that tuberculosis would have an important bearing on infant mortality in Denver.

PRENATAL CARE

From a statistical standpoint, some of the most satisfactory data in the study have been found in the correlation of prenatal visits and infant mortality. Taking the whole sample, we get a record of infant deaths by prenatal visits shown in Table V.

TABLE V

INFANT MORTALITY IN DENVER CLASSIFIED BY PRENATAL VISITS

No. of prenatal visits	*Live births*	*No. of deaths*	*Infant mortality rate*
None	375	74	198
1 or 2	846	109	129
3 or 4	692	73	105
5 or 6	678	49	72
7 or 8	758	33	44
9 or more	1,162	35	30

Table VI shows the percentage distribution of prenatal visits among the stillbirths, the live birth deaths, and the live births exclusive of deaths.

TABLE VI

PERCENTAGE DISTRIBUTION OF PRENATAL VISITS

	Live births exclusive of deaths		*Live birth deaths*		*Stillbirths*	
No. of visits	*Number*	*Percentage*	*Number*	*Percentage*	*Number*	*Percentage*
None	299	6.1	74	18.0	24	13.5
1 or 2	737	15.0	109	26.6	36	20.2
3 or 4	619	12.6	73	17.8	32	18.0
5 or 6	629	12.8	49	12.0	20	11.2
7 or 8	725	14.7	32	7.8	28	15.7
9 or more	1,127	22.9	35	8.5	24	13.5
Not reported	784	15.9	38	9.3	14	7.9
Total	4,920	100.0	410	100.0	178	100.0

As might be expected the small number of prenatal visits is found to predominate among the stillbirths and live birth deaths, while most of the infants who lived through their first year were born to mothers who had had the benefit of 5 or more prenatal visits.

While a large number of the cases undoubtedly must be listed with the unavoidable hazards of life and death, it is believed that

Denver's high infant mortality can be made to yield substantially to corrective efforts. At this stage it is already clear that the city requires relief from the archaic housing conditions that obtain in the "Shacktown" area along the Platte River. The mayor and the manager of public health have already made use of the charts prepared under the study, for the elimination of 318 of the least inhabitable old shacks. The city auditor has advised the writer that in the condemnation of these undesirable houses not a single suit has had to be defended in the courts. The Denver Real Estate Exchange has coöperated to the extent of obtaining the lowest possible rents for the displaced families in housing of a better grade. The city has also coöperated with the Citizens' Unemployment Committee by providing emergency employment repairing dilapidated open ash pits, tearing down insanitary out-houses and clearing backyards, in a general effort to raise the housing level among those who do not appear to be able to help themselves.

These preliminary steps, taken shortly after the housing data were released to the city health authorities will, it is hoped, pave the way to a more comprehensive program in respect to other aspects of the study. A few examples suggest themselves: The Mexican population, whose settlement in Denver is a response to the needs of the beet sugar industry, offers a special problem in the adjustment of a simple, rural folk to urban conditions. The loose employment of "Prematurity" as a convenient diagnosis in early deaths, coupled with the relatively high proportion of deaths under 1 day in Denver, suggests the need of a closer follow-up of the causes of mortality in early infancy. If early prenatal care is a matter of general concern, the problem of saving apparently well-born infants looms as a neglected factor especially applicable to the submerged classes of the population.

Among those who have actively participated in this study, the feeling prevails that an analysis of the infant mortality of a community offers significant clues to its more general social and economic problems.

NOTE: The writer wishes to acknowledge that the collaboration of Professor F. L. Carmichael, director of the Statistical Laboratory in the Bureau of Business and Social Research, University of Denver, is reflected in the statistical material supporting this paper. Research Fellows of the Bureau, who have coöperated in the tabulation of the data, include Jesse R. Wood, Jr., Raymond Nassimbene, Alice B. Lester, and Helene Sipprelle. The field investigations were made by the staff of the Denver Visiting Nurses Association, and supervised by Dorothy Watkins Conrad, R.N.

Effect of Hyperpyrexia Induced by an Ultra-high Frequency Current on *B. typhosus* Agglutinin and Complement

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THERE appeared in the literature as early as 1915 a controversy as to whether high fevers depress or destroy the agglutinins to *B. typhosus* in vaccinated individuals. Tidy [1] observed that febrile conditions apparently remove the agglutinins to *B. typhosus* from the blood after inoculation. Dreyer,[2] however, disagreed with this view. After further observations Tidy [3] again stated that in his opinion marked hyperpyrexia of whatever cause, in inoculated individuals, tends to destroy the agglutinins. Dreyer [4] then showed that in a series of 108 cases inoculated within a year, various febrile diseases failed to change the agglutination titer materially. Tidy [5] pointed out that Dreyer had no controls for his series and was, therefore, not justified in his conclusions. Up to the present, so far as we know, no further work has been contributed to clear up the controversy.

An opportunity presented itself to produce hyperpyrexia in experimental animals by means of placing them in the electromagnetic field created by a high frequency vacuum tube oscillator. By means of the hyperpyrexias thus induced, it was possible to study further the effects of high fevers on agglutinins and complement.

Although Schereschewsky [6] had thought the band of frequency of such a current between 20,000,000 and 80,000,000 cycles per second exerts a specific lethal effect on living tissue cells, it has been shown by Knudson and Schaible,[7] Jacobson and Hosoi,[8] Bischoff, Ullmann, Hill and Long,[9] and Mortimer [10] that the physiological and morphological changes produced by exposure to an ultra-high frequency current are no different from those produced by hyperpyrexia induced by any other method. Christie and Loomis [11] have shown that the effects produced on animals can be fully explained on the basis of the heat generated by the induced high frequency current. They could find no evidence to support the theory that certain wave lengths have a specific action on living cells.

TABLE I

AGGLUTININS (TYPE EXAMPLE RABBIT 1958)

Animal	Date 1932	Time Heated Hrs.	Temperature Degrees C.	Hb. Per cent	R. B. C.	Agglutinin Titers
Rabbit 1958	4– 1		38.6	65	4,460,000	1:320
" "	4– 1	3	41.9	63	4,310,000	1:160
" "	4– 2		38.4	61	3,800,000	1:160
" "	4–25		38.5	67	5,150,000	1:80
" "	4–25	2½	41.2	72	5,220,000	1:40
" "	4–26		38.1	68	3,120,000	1:40
" "	5– 4		38.0			1:80
" "	5– 9		37.5	72	5,300,000	1:80
" "	5– 9	2	42.1	65	5,350,000	1:40
" "	5–10		37.4	68	4,825,000	0

The physiological effects of the alternating current can be profoundly changed by variations in frequency (D'Arsonval [12]). As the frequency of alternation is increased, a point is reached where stimulation no longer occurs, and the subject feels only a sensation of warmth and prickling of the skin. As the frequency is still further increased, the prickling sensation disappears until at 10^6 cycles per second, heat production is the only effect which can be demonstrated. At frequencies below 50,000,000 cycles per second the effect of these radiations on animals is proportional to the intensity of the electromagnetic field.[11] Using this type of machine, then, we can test the effect of hyperpyrexia without fear of any complicating side effects.

METHOD OF EXPERIMENT

A high frequency vacuum tube oscillator, manufactured by the General Electric Co. was used to induce the fever. The animals were placed in a well ventilated wooden box in the electromagnetic field created by two metal electrodes between which the current alternated at 10^7 cycles per second. The temperature of the animals was recorded by a rectal thermometer, care being taken to insert the bulb well into the rectum in order to get true readings. The temperature was controlled by regulating the distance between the electrodes.

Five rabbits were tested for the thermal effect on agglutinins to *B. typhosus*. One month before the hyperpyrexia was produced these animals were prepared by subcutaneous inoculations, (4) at 5-day intervals, of 0.5 and 1.0 c.c. of killed typhoid vaccine containing 1,500,000,000 organisms per c.c. Routine agglutinations were done before and after heating, using the Kinyoun strain of *B. typhosus*.

The serum of 3 rabbits in 1:2 dilution, and 9 guinea pigs in 1:30 dilution were titrated before and after heating for complement.

In each animal, also, red blood cell counts and hemoglobin determinations (Sahli method) were made both before and after heating, in order to determine the effect of radiation on blood volume.

RESULTS OF EXPERIMENT

Five rabbits were heated for lengths of time varying from 30 minutes to 4½ hours. The temperature obtained was 40.2° to 43° C., a change of 2.1°–4.9° C. from the normal. In each case, after heating, the agglutination titer was lowered, greater depression being observed after the longer periods of heating. The titer of the agglutinins had returned to normal within 24 hours to 1 week in every case except 1, in which the titer kept decreasing in spite of the administration of an additional 1 c.c. of vaccine. In 1 instance, in which the temperature had reached 43° C., the animal did not survive and the terminal agglutination titer rose to 1:1,280, whereas the original titer had been 1:320. The blood volume was concentrated little or not at all by the extreme hyperpyrexias, as shown by the hemoglobin and total red cells, the latter being very slightly changed except in the fatal case in which both were markedly increased.

Nine guinea pigs were heated from 30 minutes to 3½ hours. Temperatures of 40.0° to 42.8° C. were obtained representing a rise of 2.8° to 6.2° C. from the normal. In each case the complement was depressed during the first heating. In 2 cases the complement decreased as the temperature returned to normal, only to be again depressed by a second heating. In 3 cases the complement was restimulated by subsequent heatings. As in the other animals, it was found that there was little or no change in the blood volume except in the fatal case in which it was decreased as shown by the increased hemoglobin and total red cells.

Three rabbits (Table II) were heated from 1½ to 2 hours. The temperatures reached were 40.1° to 43.1° C. a rise of 1.6° to 3.9° C. from the normal. Complement was decreased during the hyperpyrexia in all but 1 case (1958) in which it was stimulated. In 2 cases,

TABLE II

COMPLEMENT (TYPE EXAMPLE GUINEA PIG I)

Animal	Date 1932	Time Heated Hrs.	Temperature Degrees C.	Hb. Per cent	R. B. C.	Complement 1:30 Complete Hemolysis in
Guinea pig 1	3- 2		35.3	85	4,510,000	1:145
" " "	3- 2	2	41.0	75	4,500,000	1:125
" " "	3- 3		36.8	75	3,840,000	1:125
" " "	3-29		36.0	85	5,600,000	1:100
" " "	3-29	3½	40.5	75	4,840,000	1:125
" " "	3-30			68	3,500,000	1:100

(TYPE EXAMPLE RABBIT 1958)

						Complement 1:2
Rabbit 1958	4-25		38.5	67	5,150,000	1:110
" "	4-25	2½	40.0	72	5,220,000	1:200
" "	4-26		38.1	68	3,120,000	1:250
" "	5- 4		37.5			1:100
" "	5- 9		37.5	72	5,300,000	1:200
" "	5- 9	2	42.1	65	5,350,000	1:100
" "	5-10		37.4	68	4,825,000	1:100

in which complement was depressed during the fever, it rose as the temperature returned to normal. Blood volume was very slightly changed as evidenced by hemoglobin and total red cell counts.

These results are important in the routine diagnosis of typhoid fever when often, during the hyperpyrexia, blood is withdrawn for a Widal test and a low titer (1:60) found. Such cases have come to our notice and stimulated this work.

SUMMARY

1. Hyperpyrexia was induced in 9 guinea pigs and 10 rabbits by means of a high frequency electric current. Temperatures of 40.5°–43.1° C. were obtained. Temperatures of 42° C. or over, if maintained for any length of time, were lethal.

2. The hyperpyrexia so induced depressed, but did not entirely destroy, inoculation agglutinins to *B. typhosus*. The amount of depression was roughly proportional to the length of time of heating and the degree of temperature obtained.

3. The inoculation agglutinins returned to their original titer within 24 hours to 1 week, except in 1 fatal case in which there was a terminal stimulation beyond the original titer.

4. Complement was usually depressed on first heating, but on a second was stimulated. In no case was it completely or permanently destroyed.

5. Hyperpyrexia has no permanent effect on inoculation agglutinins. If they are depressed during the time of fever, they soon return to normal.

NOTE: We wish to thank Dr. C. J. Wiggers for the use of the high frequency vacuum tube oscillator and Dr. H. A. Blair for his advice on the use of the machine.

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Safety Education

THE progress of safety education in the schools of the United States will be traced by William John Cooper, U. S. Commissioner of Education, at the Twenty-First Annual Safety Congress and Exposition, October 3 to 7 in Washington. While automobile accidents involving adults have been increasing in recent years, accidents involving children of school age have been drastically reduced, and this is largely the result of teaching habits of play and work to children in the school.—*Public Safety* (National Safety Council), 6, 9:10 (Sept.), 1932.

Observations and Studies on Silicosis by Diatomaceous Silica*

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BECAUSE of the excessive morbidity and high mortality from silicosis and tuberculosis, the South African Government created, in 1926 at Johannesburg, the Miners' Phthisis Medical Bureau. It is due to the researches of this bureau that we owe our modern knowledge of silica dust diseases.

At the Rand there are employed nearly 200,000 miners—European and native. These men work in quartzite which contains from 86 to 96 per cent of silica. As there is such a wealth of material for scientific investigation it was possible for investigators to determine the causation and the pathology of the disease. Much credit is due to Drs. W. Watkins-Pitchford and Mavrogordato for their statistical studies and for the classification of the different stages of the disease. This was determined from physical examinations, chemical and roentgen-ray examinations, and autopsy findings. They demonstrated that silica of 0.5 to 5 μ gained access to the lung structure by the endothelial wandering cells, lining the air vesicles. These cells engulf the particles and carry them into the lymph channels where they become encapculated and ultimately fibrosed in the lung structure.[1]

A characteristic change in simple silicosis is the production of a pigment about the silica particles that have accumulated about lymph spaces, blood vessels, and the finer bronchial structures. Ultimately many of these particles and pigments become surrounded and infiltrated with new areas of fibrosis and nodules. In tuberculosis with silicosis there is always an excess of pigment at the immediate site where the specific lesions are nodulated and have undergone fibrosis.

It has been practically demonstrated by all investigators that silica is the only dangerous dust that causes definite pathology in the lung tissues with the exception of bacteria, and that pulmonary silicosis is probably caused by the colloidal action of hydrated silica

* Read at the Third Annual Meeting of the Western Branch American Public Health Association at Denver, Colo., June 11, 1932.

formed from the minute particles of dust disseminated through the lobes of the lung. With the etiology and pathology understood, investigations were carried on to determine the various stages and progress of the symptoms of the disease and the interpretation of the roentgen-ray examinations during these stages. At the same time this brought about careful medical supervision and methods of controlling dust hazards as preventive measures.[2]

There is evidence to show that the activity of colloidal silica in the lungs may be prevented by protecting the silica dust with a substance known to coagulate colloidal silica.[3] This explains why the morbidity and mortality are lessened and the length of time increased before the "effective period" occurs, as has been shown in certain abrasive industries where clay is present with the silica and in coal mines where shale is present.

These important observations should receive careful consideration by mine operators. They should determine the physical and chemical structure of the material mined or quarried and a careful analysis should be made of the percentage of silica and other contents that make up the substance. One may theoretically be able to determine the length of time it requires the different stages of silicosis and tuberculosis to ensue by the amount of silica present and to draw conclusions when the inert substances that have a coagulating effect on the particles of silica in the pulmonary structures are absent or present in smaller percentages.

Experimentally it may prove beneficial to introduce in quartz mines inert clays to obviate the silica hazards even after such preventive measures as mechanically driven ventilating exhausts, dust traps, and wet processes of drilling have been installed.

Furthermore, the careful studies of investigators in this country and Great Britain since the pioneer researches at the Rand enriched the literature by statistics, methods of diagnosis, technic and interpretation of roentgen-ray examinations; they have also brought about legal classifications for compensation and methods for prevention. Clinical experiences, mortality statistics, and post-mortem examinations are convincing proofs that silica is dangerous, as it produces a lung pathology that is a favorable site for the ravages of the tubercle bacillus. The effect of coal on miners and cement dust on the workers exposed tends to chronic bronchitis and pneumonia, and occasionally tuberculosis.

At the Rand two clinical forms of silicosis are recognized: simple silicosis and silicosis with tuberculosis. In simple silicosis, a condition arises which is associated with the presence of numerous

small inert nodules of dense fibrous tissues scattered symmetrically and uniformly throughout the parenchyma of both lungs. When these nodules are abundant and closely aggregated, upon the slightest exertion the worker experiences shortness of breath. The intensity of this symptom is in proportion to the amount of exertion. The outstanding physical signs are limited expansion, slight dullness in the upper part of the chest, harsh and high pitched inspiration, and a tendency to obesity.

Later, in the second stage, the nodules become larger, are aggregated into masses, and tuberculosis is superimposed. The clinical features are increased limitation of chest expansion, loss of weight, marked dyspnea, cough, expectoration, pleuritic pains, and much disability with cachexia. Of the advanced cases, 78 per cent were observed to be of this type and all among the native workers due to their marked susceptibility to the tubercle bacillus. The onset in all cases was simple silicosis. From silica dust contact to the recognition and appearance of silicosis is about 10¼ years. This is known as the "Effective Period."

In the past decade many studies have been published on silicosis and other diseases caused by dusty trades. Extensive investigations were made on the lung pathology by the introduction of silica subcutaneously into the tissues and by silica inhalation. New methods of determination of air dustiness have been devised. The cardinal symptoms of the disease have been determined by all the modern methods.

Many contributions have been added to the knowledge of pneumoconiosis due to silica and many special fields have been investigated—"Miners' Consumption Among Zinc Miners in Missouri"; "Problem of Dust Phthisis in Granite Stone Industry"; "Exposure to Calcium Dust in Cement Plants"; "Dust Inhalation by Hematite Miners"; "Silicosis Among Rock Drillers, Blasters, and Excavators in New York City"; "Effects of Coal Dust on Miners"; "Dust Hazards in the Abrasive Industry," etc., etc.

In California about 350 miles south of San Francisco, in Santa Barbara County, there exists the largest and purest diatomaceous deposit probably in the world. This is in the Coast Range Mountains, at an altitude of 400 to 600 feet above sea level and 10 miles inland. A large firm is now utilizing this substance for commercial purposes. This deposit is composed of fossilized diatomes and microscopic unicellular marine algae with a silicified cell wall which when dry contains about 85 per cent silica. Due to its remarkably diversified properties it is extensively used in various important industries.

The natural substance looks like a fine deep cream colored powder. It is the greatest nonconductor of heat known and bricks made from it are used in building furnaces.

Due to its lightness, porosity, whiteness, and clarifying qualities it is also used extensively as a filtering agent. Also, due to its high silica content, it is a permanent element in concrete and does not affect the time of setting. It is also used extensively in the abrasive industries.

Being an entirely new enterprise, the operators were obliged to devise and construct special machinery for transportation, refining, and manufacturing. The machinery has not yet been perfected, although improvements in construction are constantly being evolved. Due to these imperfections and the operative methods a great deal of dust is disseminated in the atmosphere in certain working zones and constantly surrounds the habitations of the workers, as the plant operates night and day.

This material is transported from the mine by aerial trams to the cyclones and grinders in the mill, in preparation for the dryers and other machinery. The menace is due to vast clouds of dust which escape and endanger the immediate workers and are also disseminated by the prevailing winds over the district where the employees reside. At the mill the bag house is very dusty, as well as the packing quarters where the product is sacked; also where bricks are made by being sawed.

In the mine the ventilation is excellent and dust is not a factor on account of the high percentage of moisture in the product. The only places in the mine where the dust is pronounced are at the "glory hole" discharge terminals where the drag lines operate, and where the dumps are released to fill the trams.

The workers are selected Mexican laborers who have been given a physical examination by the company's physician before being employed. These people, being primarily Indian, have the highest tuberculosis mortality rate in the United States. One hundred and eight employees were given a roentgen-ray examination of their chests; the films were interpreted; and their social and medical histories taken, by the technical staff of the Bureau of Tuberculosis of the California State Board of Health. The films were rechecked by a roentgenologist at the University of California Medical School and the chest physical examinations made by the two authors, both of the University of California. The dust content estimations were made by the U. S. Bureau of Mines; the industrial hygienic survey, and recommendations were conducted by Dr. Legge.

The 108 men selected were graded as follows: employed less than 1 year; 1 to 2 years; 2 to 5 years; 5 years or more; the purpose being to determine for statistical purposes the possible time and degree required to affect the worker.

The primary motive of the study was to determine for the California Tuberculosis Association whether the hazard was definitely instrumental in increasing the county's tuberculous incidence, also to make a preliminary study as to the degree of silicosis found by physical and roentgen-ray examination.

The ages of the Mexican laborers studied ranged from 19 to 56 years. Pneumoconiosis due to silica of various degrees was found present in 81, or in 68.5 per cent of the cases. It is readily observed in Table I that the disease is a very slow growing process and advances with the years of employment.

TABLE I

	Groups				
	I	*II*	*III*	*IV*	
	Years employed:				
	0–1	*1–2*	*2–5*	*5 or more*	*Total*
Very early pneumoconiosis	0	0	8	7	15
Early pneumoconiosis	6	12	11	16	45
Moderately advanced pneumoconiosis	0	2	4	9	15
Advanced pneumoconiosis	0	0	1	5	6

It is noted that the predominating form of the disease is in the early stage, 60 men showing early pneumoconiosis, whereas 15 were in the moderately advanced stage and only 6 in the advanced stage.

TABLE II

	Years employed:				
	Less than 1 year	*1 to 2 yrs.*	*2 to 5 yrs.*	*5 yrs. or more*	*Total*
General Appearance:					
Good	13	16	33	37	99
Fair	2	3	2	4	11
Emaciated		2		6	8
Clubbing of Fingers:					
None	5	3	15	9	32
Slight	9	16	18	32	75
Moderate	1	1	1	5	8
Marked		1	1	1	3
Recommendations:					
Hospital care				1	1
Change of work	1		2	2	5
Re-examine 3 months	1	5	8	14	28
Re-examine 6 months	6	6	14	19	45
Re-examine 1 year	7	9	12	8	36
No recommendations		1		3	4

The outstanding features revealed by the physical examination was the splendid condition of the men. We found 99, or 84.0 per

cent, in a good state; 11, or 9.3 per cent fair; and only 8, or 6.77 per cent, poor. The physical signs were strikingly few. Limited expansion and a change in the percussion note depending upon the extent of the lung involvement, were the main signs in the chest. In 86, or 72.9 per cent, of the cases there were clubbed fingers in various degrees of development, depending upon the number of years of labor in the mine. *This is the most outstanding physical sign and also the earliest to develop.* During the first year of employment two-thirds of the cases already had clubbed fingers.

The company maintains a splendid village center with hospital, recreation activities, school, etc., and were very coöperative to ameliorate any hazards that are jeopardizing the health and safety of their employees. It is hoped that another survey may be made in the near future to follow up the preliminary investigation. The following recommendations, based on the findings, were suggested:

RECOMMENDATIONS

1. *Employment*—No person having bronchitis, asthma, tuberculosis, or cardiac disease should be employed. The selected workmen should have a recorded history of former employment and diseases; also a complete physical examination with an X-ray film of the chest, and every year thereafter the X-ray should be repeated. This ruling should apply to the officers as well as to the laborers.

2. *Clinic*—A chest specialist should hold a clinic every 3 months at the mine, the X-ray having been taken previously by the company's doctor. By examining the workers in groups of 125, the entire plant would thus have chest examinations by the end of the year. Those needing reëxaminations or observation could report at the next clinic.

3. *Rest*—There should be 1 day's rest in 7. The present work day should be of shorter hours. Workers should alternate from dusty to non-dusty employment.

4. *Family*—The women and children of the workers should be examined once a year for the reason that the Mexican has a lower immunity to tuberculosis and it would be well to know if there is tuberculosis in the family.

5. *Medical*—The company's hospital should be in charge of a well-trained physician who is capable of making a thorough physical and X-ray examination of the chest, keeping careful records, and making sanitary and safety plant inspections regularly.

6. *Mechanical*—Suitable machinery and transportation methods should be developed in order to prevent dust dissemination in the atmosphere. Mechanical exhausts, wet processes, isolation of dusty departments, and control drafts, as well as individual respirators, should be installed and be constantly a part of the plant.

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Adult Health Education*

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SHORTLY after the war, H. G. Wells made the rather startling statement that " the world must choose between education and catastrophe." These words scarcely aroused a ripple of interest. Those of us who pondered on them at all, thought he was referring to the education of children. As a matter of fact, he was talking about the adult generations. He was convinced that our stupendous blunder of identifying education with schooling and limiting that schooling to youth, could not continue if our civilization were to survive. The social, economic, and political events of the past 3 years seem to indicate the correctness of his opinion.

" It is not the education of children that can save the world from destruction; it is the education of adults. It is the adult who must be released from his narrow mindedness, his prejudices, his outworn customs, and his obsolete habits." [1] On every hand we have abundant evidence of the truth of this statement. If solutions are to be found for the vital problems upon which depend the survival of our present form of civilization, we must devise ways to educate or reëducate the adult. All this applies with peculiar force to the major health problems in which we are particularly interested.

It requires no argument to convince this group of the abundance of vital health problems which are literally crying for solution. Further, we all know that when we analyze one of these problems, in every case we give a prominent and important place in our proposed solution to what we call " education," and in these more modern days, " health education." Our discussion of adult health education, then, calls for a closer examination of what we mean by this term, and how it has become the newest shrine before which large numbers of public health workers now worship. Perhaps this analysis will also aid us in a wiser planning of our efforts to influence the attitudes and actions of the adult generation.

We have always considered the proper task of education to be the

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teaching of children. The school was invented for the purpose of providing help to the community in connection with certain needs of community life. It was natural for health workers to turn to the schools, when they sought to solve health problems by education. It had become a common method used by groups interested in the solution of social problems. Many of our earliest courses of instruction in hygiene and physiology were made compulsory by state laws promoted by an organized group interested primarily in the control of the use of alcohol and tobacco.

The first step in the evolution of our modern health education programs in schools came from a different quarter. An alliance of the physician, the health officer, the educator, and the health propagandist aroused a widespread interest in the responsibility of the schools for the health of its pupils. This has led to a gradual acceptance of health as an important objective of education. Slowly but surely, we are developing sound courses in health instruction, improved methods of health supervision, and properly trained and experienced personnel to conduct them.

The results of these health education programs are difficult to measure by our usual statistical methods. There seems to be no doubt, however, that they can and do definitely raise the level of the health intelligence and health practices of the students. We are concerned here with a consideration only of the elements entering into effective health education of children as a basis for evaluating and planning adult health education. For the educational principles underlying sound procedure will be alike for both age groups.

If you analyze any successful effective plan of health education, you will find it is always based upon sound scientific facts, it has proper provision for arousing and maintaining interest, and secures the voluntary, willing participation of the pupils. This results, even in a child, in a determined and long continued effort to train his powers of observation and thinking as a guide to his decisions in matters of health. While it is true that this result is not attained in all the pupils, it is surprising what a large number of children develop health ideals coupled with health knowledge in such a way as to put their elders to shame with their health wisdom. The weakest link in our health chain is found in the adult generation.

Our next big job is to devise and promote sound methods of adult health education. We need more than an emotional aspiration of health workers for better health as a basis for this task. It will necessitate our junking the pet theory that education is synonymous with schooling and terminates at the door of the school or college. We will

be compelled to realize that while we have neglected this important matter the field has been largely preëmpted by the quack, the charlatan, and commercial parasites who find the average adult an easy prey. It will be necessary for us to find ways to overcome the inertia or opposition of the average individual, who claims his ancient right to be ignorant, careless, thoughtless, and prejudiced about matters pertaining to health. We must seek as diligently for ways to arouse his interest as we have done for that of the child, and having gotten it—give it something substantial to feed upon. In fact, adequate health education will require skilful adaptation of our best educational methods to the attitudes and psychology peculiar to the adult.

Many of you protest that you have not neglected the field of health education. You ask: have we not given health lectures, shown health movies, published health literature, broadcast health talks, run health exhibits, promoted campaigns against various diseases, conducted prenatal clinics and mothers' classes? Yes—you have—and in many cases with remarkable skill and enthusiasm. They are all important and useful, as are many other efforts to reach the adult; but taken alone or even in combination they do not constitute "health education" in the sense we need to define it under modern conditions.

Really to educate an adult with reference to health you must do more than indoctrinate him by health propaganda—though that has its place. You cannot be satisfied merely to ladle out health information to him—though heaven knows he needs that. You must fight a terrific battle against indifference and stupidity among people who have demonstrated over and over again that they can be roused and controlled by catchwords and appealed to through simple emotions.

Our task then is to explore the principles and methods that have proved successful in producing real educational results in children and adapt them, if possible, to the adult level. The first step in such an endeavor would seem to be a critical review of the present methods of approach being used to influence the adult in his decisions on matters of health. These may be discussed for convenience under the head of health information, health propaganda, and health education.

A large part of the time and efforts of all health workers is devoted to giving out health information either to individuals or groups. This is a fundamental service without which the progress of our health programs would be delayed if not stopped. Consequently, an analysis of its place in an adult health education program is in order.

The first requisite of sound health information is that it be based upon facts. So-called health facts are frequently neither true nor important. The time has come for us to look a little closer at factual

bases of our health information. Armstrong,[2] in a recent article in the JOURNAL, proposes a current appraisal of health data:

I. Assured Health Facts:
   A. Those universally and practically applicable
   B. Those theoretically sound but limited in application because of the imperfections in available methods or for other reasons
II. Near Facts:
   A. Those about which there is a growing certainty, though as yet no absolute scientific assurance
   B. Those once generally accepted but about which there is an increasing element of doubt
III. Assured Health Fallacies

He goes a step further by suggesting that we have some facts that can be labelled Grade A facts. Included here we find such items as the established fundamentals of diet and our exact knowledge about the prevention and cure of certain communicable diseases. Under Grade B—near facts—we discover many of the very appealing ones which we believe to be true, but cannot actually prove: "Drink 4, 6 or 8 glasses of water a day; sleep 8 hours a day; brush your teeth twice a day to prevent caries," and many more which we feel are in the right direction though they need verification. It seems unnecessary to dwell upon the health fallacies—properly classified as Grade C—and not to be used by careful, reputable health workers.

It seems obvious that sound health information has an indispensable rôle to play in any plan of adult health education. That legitimate health workers are bound by their own professional standards to evaluate carefully the truth of their factual materials, and to use these accurately and honestly, even though their competitors, the quacks and commercial parasites, are bound by no such standards.

HEALTH PROPAGANDA

The word propaganda has fallen on evil days. Its early history finds it describing efforts to convert men to the religious life. The war changed this meaning to represent everything that was horrible and terrifying. Notwithstanding its shady reputation, I want to speak a good word for propaganda, especially health propaganda, for it represents an organized effort for spreading the doctrine of health and the principles that govern it. Of course, in approving it, I am referring to the propaganda based upon facts, not on fallacy, fancy, or fraud.

True or wholesome propaganda is an effort to take the certified facts that science has shown will influence the levels of health and use

them accurately and honestly to influence the individual or group without any hope of personal gain. Whenever and wherever this standard is met by the individual health worker or the organization, we have one of our most useful and necessary tools.

To be true or wholesome the facts must be certified and the use must be accurate and honest. As an example, it is a certified fact that vaccination will prevent smallpox, and consequently we are justified in using every fair means to convince the individual that vaccination is desirable. It would be neither accurate nor honest to say that the procedure of vaccination never results in infection in the individual. A large part of the educational efforts of our official and voluntary health agencies may fairly be classified under the head of wholesome propaganda.

False propaganda is based upon facts or near facts improperly or dishonestly used, or upon definite fallacies. The propagandist is motivated by either commercial or selfish aims. It is in this field that we find one of the most potent influences against both individual and community health. We need not discuss the systems of propaganda based upon definite fallacies. They are dangerous and they present some of our most difficult public health problems.

We should be more concerned, however, about the enormous increase in the types of propaganda either based upon facts or near facts. Skilfully and adroitly used by well paid and frequently well trained individuals, they are pouring a golden stream into the pockets of commercial organizations and individuals. The most superficial reading of the advertising pages of our most highly circulated magazines yields an interesting crop. Health can be very simply attained by eating so much of this or that. Pictures of attractive young ladies, flanked by the inevitable "leading medical authority" (conveniently foreign) give what Armstrong calls "an aura of reality to what is mostly fiction."

And now comes the radio. One of the most deadly sources of dangerous propaganda is the uncontrolled broadcast. The commercial ones are bad enough, heaven knows, but they fade into insignificance beside the quack. It is high time that some active steps were taken to confine the statements of these individuals to as near the truth as are the labels on foods and drugs.

HEALTH EDUCATION

This term has surely come to be something to be conjured with. It seems to mean different things to different people. Many groups claim it as their own, such as educators, school physicians, public

health nurses, nutritionists, and physical educators. Lately one hears it applied to the publicity activities of numerous commercial concerns. The explanation of this condition probably lies in the fact that a part of the process is being mistaken for the whole. We will use it here to describe all of the methods, processes, and activities which, taken together, so arouse the interest of the individual in matters of health that he is willing to make a serious effort not only to acquire health knowledge but also to establish health habits and attitudes based upon such knowledge.

When we refer to adult health education we are referring to this broader conception, for we are convinced that if we are really to educate the adult in health we must do more than expose him to health propaganda and feed him health information. In fact *we* cannot " educate " him, he must educate himself, for we agree with Buttrick, when he says: " Education is a voluntary process. In the very nature of the idea, one must educate himself." Consequently, the first step in an adult health education program is to provide methods of arousing the interest of the individual in health. This is frequently well done through the popular lecture, newspapers and magazines, movies and radio. This must be followed systematically by the second step—the provision for adequate facilities for making easily available sound scientific health information. This may mean proper health literature adapted to the needs and curiosity of the interested individual. Or it may mean the encouragement of the person to attempt some more systematic study either in a group or through independent investigation. Or again, it may call for individual medical or health guidance.

To summarize the essential points: true adult health education is an active, not a passive, process; it is based upon a maintained intellectual interest; it results in seeking adequate health knowledge; and its outcome is an individual who is capable of exercising intelligent discriminating judgment in matters pertaining to personal and community health.

If asked whether adults can be interested in this type of program, I would answer that in other fields of endeavor they have been, wherever and whenever adequate leadership has been forthcoming. Recall the lyceums, university extension courses, Chautauqua movement, forums, and study courses of various organizations in this country, not to mention the workers' education movement abroad.

Yes, adults can be interested in health education if we are ready to furnish the leadership and to organize a program that will compete successfully for the interest of the individual. This means not only sound planning but also high grade promotion of the idea. The oppor-

tunity for the promotion of public health through adult health education has attractive possibilities. I am convinced that we have men and women who are capable of exercising the leadership. This brings us to our final question of how such a program can be organized and conducted in a community.

THE PROGRAM

Our first step is to decide what we consider should be the minimum essentials for health education in any community. While the extent and completeness of this program will be governed by local conditions, every community should have well organized and unified facilities for:

1. *Health propaganda*—These facilities should include a well organized method for making available health lectures by qualified persons, health exhibit materials, reliable radio broadcasts on health, and facilities for preparing copy and securing proper health publicity. Skilful health propaganda is our best method of arousing the individual interest.

2. *Health information*—There should be provision in every community for making available reliable health information to the public. This may be done through the health department or in special programs through a voluntary agency. An excellent example of dissemination of medical information and guidance is the work of King's County Medical Society in Brooklyn, N. Y.

In addition to health information for the public, it would be profitable for us to provide easily accessible sources of more technical information for the professional health worker of the community.

3. *Health instruction*—Every community with a well considered community health plan should see to it that facilities for proper health instruction are available for all ages. This should include:

Schools—While the actual program of health instruction in the schools is the job of the school administrator, it is a legitimate function of the group interested in community health to be sure that the schools have a satisfactory course of instruction properly integrated with the community health program.

Adult classes—In this field should be included facilities for class instruction in special subjects covering even a wider range than we now provide so successfully on various special topics.

Study courses—The provision of study courses for use by organized groups, such as Parent-Teacher Associations, Women's Clubs, and we hope some day men's organizations, is one of the devices for adult health education that has proved its value, when well planned and properly conducted. In addition, it is becoming increasingly desirable to provide guidance to individuals who can be interested in an independent study of health problems through reading courses.

You will note that these suggestions are all methods with which you are familiar, and all or part of which you are using. My purpose for bringing them together is to make a plea for organization and unification of our health education programs. It seems to me that we will come closer to attaining our health objectives if we base our

health education programs upon the health needs of the whole community rather than the individual projects of our own organization.

As a definite application of this idea, it is suggested that we should organize a community council on health education, with representatives from the official health departments, educational system, voluntary health agencies, and professional groups such as physicians and dentists. This council would be an advisory and coördinating body. It might very well begin its activities by taking the following steps:

1. *Survey*—A systematic study of all the health education activities and programs in the community, and an analysis of this material with an estimate of its completeness and effectiveness as to its meeting fully the community needs.

2. *Community Program of Health Education*—With the survey as a basis, planning of a unified community health education program, including all age groups, this program to be adopted after adequate group discussion. The responsibility for the promotion of its individual projects to be allocated to the organization best equipped to carry it out effectively.

There is nothing original in this device for coördination of health activities. It has demonstrated its usefulness in many other fields. We believe that it will function in the field of health education. It is merely suggested as one method of securing a systematic, integrated plan of health education.

In conclusion, then, we may not be compelled to choose between "education and catastrophe," but we must choose between health education and failure of our public health programs. Health education of adults as well as children must become a well planned procedure based upon sound educational principles. Further, the success of our health plans as a whole will be conditioned by how clearly all of the health workers in the community see the necessity for, and are ready to participate in, a well considered, unified health education program.

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SELLING SEWAGE TREATMENT ON FACTS — NOT FANCY

IN these times of curtailed outlet for industrial enterprise, individuals and corporations are looking, with a covetous eye, at the field of municipal undertakings and improvements. This will be even more true if funds for construction of public works and utilities become available from the Reconstruction Finance Corporation. Included in this program will be the construction or extension of sewerage and sewage treatment works.

Corporations having a staff of engineers and chemists, while casting about for new business and endeavoring to make the fullest possible use of existing facilities and personnel, in some instances have become attracted to one of the frequent municipal undertakings—sewage treatment and waste disposal. They see in sewage treatment a relatively undeveloped field with an apparent ample opportunity for the production of less complex, more practical and less costly processes than are now employed. As to the treatment of industrial wastes, there seems to be an even greater field in view. Some promoters have an idea of developing self-supporting features with by-product recovery from the treatment and disposal of the polluting materials at the minimum cost and without regard to attempted recoveries of

by-products. Still others have no interest in process development, but see only an outlet for mechanical units which may be applicable in one or several existing or proposed processes.

All or any of the proposed or projected schemes can work to the good of sanitation development by giving impetus to the movement toward stream cleansing, now well under way in America. If this new undertaking, strange to individuals and corporations uninitiated in the basic principles of waste treatment and requirements in stream pollution correction, is adequately guided by experienced engineers and chemists qualified to advise in such matters, the way will be smoother, and progress sounder and more rapid in the long run. Such advisers or consultants must be competent to understand what is required in the matter of degree of purification in given instances; wherein a particular process may be adequate or inadequate; wherein it will be able to produce results alone or may require amplification to the extent of some secondary treatment, biological or chemical. So far there has not appeared a simple and economical process which can be considered ample under all circumstances of stream condition and waste treatment and it does not seem probable that a single process will answer. There is need for greater flexibility than is economically procurable from a single process and it will be necessary for those developing new and unproved schemes to consider this feature carefully.

In marketing new schemes, or old ones which have been improved and amplified, it will be necessary to "sell" on *fact* and not on *fancy*. The process which produces an effluent pleasing to the eye, without odor nuisance, and void of elements dangerous to human or animal health, will answer the requirements in a great majority of instances, but there will be others wherein the residual but invisible organic matter in such an effluent may be more than the stream can assimilate during the critical periods when flows are deficient. During such periods amplification of the otherwise satisfactory treatment may prove essential.

Mechanical or chemical engineers thoroughly competent to develop industrial processes, and already proved successful in their field, may find themselves poorly understood by the sanitary engineer or the chemist of experience in stream pollution matters. These same men with the assistance of the experienced sanitarian, working in close coöperation and acting as an interpreter of the language and viewpoint of the state and national health departments or stream pollution commissions, may produce a process of waste treatment superior to any yet developed.

Producing and marketing novel processes and equipment for sewage treatment has not proved and will not prove as simple as the producers may expect, and much confusion will result unless these producers or promoters market the process on a sound technical basis with the aid of staff members or counsel qualified to evaluate pollution conditions and definitely assure economically sound performances commensurate with requirements. Disregard of such principles in marketing new sewage treatment processes by attempting to "sell" by other and less sound methods has not met with any real and material success in the past nor will it now.

THE WASHINGTON MEETING

WE wish to call attention to the 61st Annual Meeting of the American Public Health Association, the time for which is rapidly approaching. Washington is the place, a city always full of interest from many different standpoints. Everyone wishes to go to Washington at least once a year, and this occasion will present an opportunity of attending a scientific meeting which is full of interest as well as of visiting the Capital City of our country. Other countries have been hit by the depression, but the attendance at scientific meetings has been good in spite of this, and we wish now and here to urge everyone who can possibly do so to be with us.

The preliminary program shows that there is certainly no depression in the production of scientific work, for which we have every reason to be thankful. While the program discusses matters of general interest on topics in which all are interested, in Washington there will be several special features. There will be five speakers on mental hygiene, all of whom are well known specialists. The prevention of diphtheria, the consideration of toxoids as against toxin-antitoxin, the standardization of serums, studies of the value of serums in the treatment of poliomyelitis, tests for anti-pneumococcic serum, and many other items will be considered. The program of the Laboratory Section is especially complete, and there are few matters of interest to laboratory workers which are not included in it.

There will be one paper on the relation of heart disease and public health. We have had a great deal of material on throat infections followed by rheumatism, on the tonsils as routes of infection and production of valvular disease of the heart; but very little has been written upon heart disease as a public health problem directly.

The Section on Food and Nutrition is also well filled, covering

many items of special interest. A new feature has been added—the Public Health Ten Star Final, in which specialists will give a symposium on the current work of the ten sections now composing our Association. The names of those taking part in this symposium assure us of its value and interest.

Another feature will be the Institute on Health Education, the purpose of which is to provide instruction in the content and methodology of health education to a limited number of persons actively engaged in this work.

At the same time that our meeting is going on, a number of other closely related societies, in which many of our members hold membership, will hold sessions, such as the American Association of School Physicians, International Society of Medical Health Officers, Conference of State Sanitary Engineers, State Laboratory Directors' Conference, Association of Women in Public Health, Delta Omega, American Social Hygiene Association, etc. Several of these have met coincidently with us for several years; but this year we have in addition the National Shell Fisheries Association and Oyster Growers and Dealers Association of North America, with a program which includes many interesting items beginning with the biology of the oyster, and ending with the hygienic supervision of the shellfish business.

It scarcely seems necessary to mention the many attractions of the City of Washington, with its museums, art galleries, the wonderful Congressional Library, governmental departments, the National Institute of Health, etc. It was hoped that the new buildings of the National Institute of Health would be open in time for this meeting, but this expectation will not be fulfilled. However, the contracts have been let and the administration building is under way.

Once again we wish to urge all members to make every effort to be present so as to make our 61st gathering, the first annual meeting held in Washington since 1918, a great success.

ASSOCIATION NEWS

WORD has been received that President Hoover will honor the American Public Health Association by appearing before it at some occasion during the sessions of the Sixty-first Annual Meeting, if it is at all possible for him to do so. No one will doubt that Mr. Hoover's wishes in the matter are to bring a greeting to the Association. His absorbing interest in public health is too well known to need comment.

Mr. Hoover has been an Honorary Fellow of the American Public Health Association since 1917. He is Honorary President of the American Child Health Association and President of the American National Red Cross.

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.

Health Officers Section

P. P. Causey, M.D., Courtland, Va., Southampton County Health Officer

Frederick E. Clark, M.D., 316 New York Ave., Ogdensburg, N. Y., Health Officer

Charles W. Decker, M.D., 116 Temple St., Los Angeles, Calif., Health Officer

Theodore F. Foster, M.D., Board of Health, West Hartford, Conn., Superintendent of Health

Jacques P. Godard, 10 rue des Archers, Lyon, France, Public Health Administration (Assoc.)

Burdge P. MacLean, M.D., 33 Fairview St., Huntington, N. Y., Deputy Commissioner of Health

Harry E. Ransom, M.D., City Health Dept., Des Moines, Ia., Health Commissioner

Elwin F. Reamer, M.D., P. O. Box 1598, Modesto, Calif., Stanislaus County Health Officer

J. W. Scudder, M.D., Calhoun, Ky., Director, McLean County Health Dept.

Laboratory Section

Elmer J. Pearson, Box 1304, Minot, N. D., Bacteriologist, Minot Branch Laboratory

Public Health Engineering Section

Ben L. Grimes, Jr., Box 881, San Angelo, Tex., District Engineer, State Dept. of Health

Robert H. Murray, C.E., Dept. of Public Health, Regina, Sask., Director, Division of Sanitation

E. C. Sams, 614 E. Burton St., Murfreesboro, Tenn., Sanitary Inspector, Rutherford County Health Dept.

Industrial Hygiene Section

Elston L. Belknap, M.D., 231 W. Wisconsin Ave., Milwaukee, Wis., Medical Director, Globe Union Manufacturing Co.

Ernest T. Manning, M.D., Rm. 1224, Telephone Bldg., Omaha, Nebr., Health Director, Northwestern Bell Telephone Company

Child Hygiene Section

Arthur S. Lamb, M.D., McGill University, Montreal, P. Que., Director, Dept. of Physical Education

Mary E. Morse, M.D., Wine Ave., Hyattsville, Md. (Assoc.)

Elizabeth C. Wells, M.D., 513 W. Main St., Riverhead, N. Y., School Physician

Public Health Nursing Section

Leah M. Blaisdell, R.N., State Dept. of Health, Albany, N. Y., Assistant to the Extension Secretary, Staff Education Program for Public Health Nurses of New York State

Florence D. Fischer, R.N., Washington County Health Dept., Jonesboro, Tenn., Public Health Nurse

Betty M. Pennington, R.N., Obion County Health Unit, Union City, Tenn., Public Health Nurse

Vincent Saccardi, 4815 17th St., N. W., Washington, D. C. (Assoc.)

Gertrude G. Shay, R.N., Metropolitan Life Insurance Company, Jersey City, N. J., Local Supervisor, Nursing Service

Emily M. Smith, R.N., Washington County Health Unit, Jonesboro, Tenn., Public Health Nurse

Mary E. Walker, 1601 Bolton St., Baltimore, Md., Superintendent, Instructive Visiting Nurse Association

Epidemiology Section

Gaston Melo Andrade, Depto de Salubridad, Paseo de la Reforma y Calzada de Tacubaya, Mexico, D.F., Mex., Chief, Public Health Dept.

Burke Diefendorf, M.D., Copake, N. Y., District State Health Officer

Charles H. Halliday, M.D., 3505 N. Calvert St., Baltimore, Md., Epidemiologist, State Dept. of Health

Unaffiliated

C. T. Conway, U. S. Standard Products Co., Merchandise Mart, Chicago, Ill. (Assoc.)

J. O. Dean, M.D., Lawrenceville, Va., U. S. Public Health Service

ADDITIONAL APPLICANTS FOR FELLOWSHIP *

HEALTH OFFICERS SECTION—John D. Monroe, M.D., Pontiac, Mich., Vladimir K. Volk, M.D., Dr.P.H., Pontiac, Mich.

LABORATORY SECTION—James Gibbard, M.Sc., Ottawa, Ont., Canada, Edward L. Miloslavich, M.D., Milwaukee, Wis.

VITAL STATISTICS SECTION—Lloyd R. Gates, D.P.H., Ann Arbor, Mich.

DECEASED MEMBERS

Lafayette Higgins, Des Moines, Ia., Elected Member 1913, Fellow 1922

Mathilde S. Kuhlman, R.N., Albany, N. Y., Elected Member 1920, Fellow 1927

Davis Furman, M.D., Greenville, S. C., Elected Member 1929

O'Neill Kane, M.D., Kane, Pa., Elected Member 1928

Cassius T. Lesan, M.D., Mount Ayr, Ia., Elected Member 1929

* See JOURNAL, Aug., p. 847, and Sept., p. 947.

Members and subscribers are requested to send notification of any change of address to the office of the Association as promptly as possible.

PUBLIC HEALTH ADMINISTRATION

Baltimore Health and Hospital Survey—A comprehensive survey report of the health and hospital service in Baltimore for the year 1931 has been prepared by Surgeon Joseph W. Mountin of the U. S. Public Health Service. The survey staff functioned under a large Citizens Committee and sub-committees concerned particularly with executive problems, general administration, communicable diseases, maternity and infancy, hygiene of the school child, general sanitation, and hospitals.

The city health department budget for 1932, of $719,336, is 20.3 per cent below that of the preceding year. The proportional reduction in personnel and activities is about the same. The sum expended by the health department represents only a small part of the total expenditure of the city and—

> It would seem that Baltimore might very well devote a larger percentage of its tax dollar to health purposes, since with advancing science health becomes more and more a purchasable commodity.
>
> Experience has demonstrated that a health program becomes a more potent influence when activities are localized. Certain functions, notably child hygiene and nursing, are being developed on a neighborhood basis, but there should be administrative decentralization as well. A limited number of sub-offices should be established at strategic points throughout the city for the distribution of existing services.

Regarding personnel, it is considered desirable as the future policy to employ full-time trained public health workers for the administrative and regulatory functions of the health department and to draw on the practicing physicians with special training when filling clinical positions requiring only part-time service. The formation of a Council of Health Agencies is suggested. On this Council would be represented the various official and nonofficial organizations engaged in public health and related activities. It could serve as a forum for the discussion of projects affecting two or more member agencies; it would be a medium for interpreting public health work to the people, and a means for organizing public support of the work. In addition, it is believed that the position of the health commissioner would be strengthened were he to assemble a group of consultants to whom he could turn for advice on particular problems.

This carefully prepared document charts a course for future development of public health work in the city along lines which seem sound in the light of modern knowledge. Many of the principles set forth should prove of practical interest to many health administrators.

I. V. H.

Ontario County, N. Y.—In a survey conducted in June, 1930, there was summarized an outline of the existing health facilities of Ontario County, official and voluntary, town, village, and county, with a recommendation that there should be only one health agency in the county. Surprisingly it is shown that a modern consolidated full-time health organization with well trained personnel will cost the taxpayers less than the obsolete township system now in effect. The principal stumbling block to progress seems to be the 14 town and village health officers who are dependent in part, at least, upon their meager stipends.

Ontario not only blazed the trail in the pioneer days of New York State

when it included within its boundary all the territory west of Albany, but it was the first New York county to boast, in 1906, of a county public health laboratory. Its tuberculosis hospital has been in operation since 1910. It is one of two counties in the state which have taken advantage of the state law permitting the organization of a county school hygiene district.

With a population of 54,239 in 1930 a preliminary estimate of budget is placed at $76,760 to include a health officer and assistant, 16 nurses including a chief, half time of a tuberculosis officer (who will also be superintendent of the sanatorium), 3 inspectors, a clerk, a stenographer, $16,000 for travel, $7,000 for laboratory, $1,000 for office expense and $4,000 for miscellaneous expense.—Allen W. Freeman, Survey of Health Organization, New York State Charities Aid Association, *Pub. 198*, 1932.

Administrative Practice in Scarlet Fever—As of 1930, a detailed examination has been made of the isolation and quarantine requirements for scarlet fever in 44 of the larger cities of the United States. In many instances the regulations are decidedly confused and often indefinite. There is also a lack of uniformity in principles involved. There should be prepared minimal restrictions compatible with safeguarding the public health. There is need for clarification of terms and better understanding of the technics involved. Also, uniform terminology would permit progress through comparison of experiences. Evaluation of the bacteriological methods now in vogue, the effect on the communicability of scarlet fever, of degrees in type of disease, age of patient, and geographical and seasonal variations are only a few of the relationships to be determined.—George B. Darling and John E. Gordon, American Administrative Practice in the Control of Scarlet Fever. *J. Prev. Med.*, 6:185 (May), 1932.

Poliomyelitis in San Francisco—In 1930, the California district experienced its most extensive outbreak of poliomyelitis. Beginning in June, 1930, the epidemic continued through the following March. There were reported 245 local and 50 non-local cases, and 32 deaths. Although no part of the city was free from the disease, it was found that the prevalence was directly proportional to the density of population. Males were affected more frequently than females and 75 per cent of the males were hospitalized.—J. C. Geiger and J. P. Gray, Statistical Study of Poliomyelitis in San Francisco in 1930, *J. Prev. Med.*, 6:145 (May), 1932.

LABORATORY

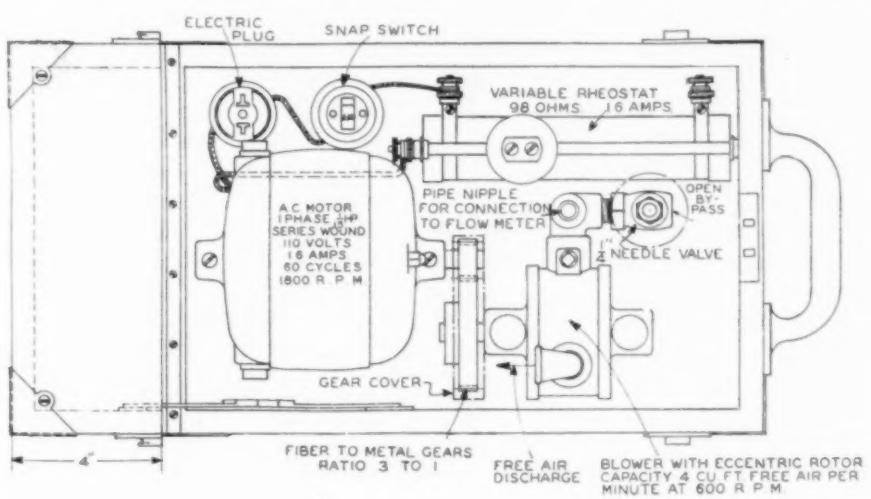
THE GREENBURG-SMITH IMPINGER SAMPLING APPARATUS FOR DUSTS, FUMES, SMOKE, AND GASES[1]

LEONARD GREENBURG, M.D., PH.D., F.A.P.H.A.
Department of Public Health, Yale School of Medicine, New Haven, Conn.

ONE of the most important of present-day problems in the field of industrial hygiene is that concerned with the effects of the dust which the worker is forced to inspire by virtue of his occupational exposure. In the study of such problems it is essential to obtain accurate information concerning the amount, size and nature of the dust suspended in the air of the workroom.

The Greenburg-Smith impinger apparatus was designed by the writer and G. W. Smith for the purpose of sampling aerial dust.[2] This instrument was found to be superior to the others tested at the U. S. Bureau of Mines during the course of a detailed study of the sampling efficiencies of the various instruments available for this purpose.[3] When operating at a sampling rate of 1 cu. ft. per minute this instrument possesses high catching efficiency when tested against dust or smokes. A representative sample may therefore be obtained in a relatively brief sampling period. With this instrument any suitable liquid may be used as the sampling medium which may then be studied microscopically or analyzed chemically.

On the completion of the laboratory studies this instrument was placed in field use. For the past 9 years it has


ELECTRIC PLUG
SNAP SWITCH
VARIABLE RHEOSTAT 98 OHMS 16 AMPS
A.C. MOTOR 1 PHASE 1/2 HP SERIES WOUND 110 VOLTS 16 AMPS 60 CYCLES 1800 R.P.M.
PIPE NIPPLE FOR CONNECTION TO FLOW METER
OPEN BY-PASS
1/4" NEEDLE VALVE
GEAR COVER
4"
FIBER TO METAL GEARS RATIO 3 TO 1
FREE AIR DISCHARGE
BLOWER WITH ECCENTRIC ROTOR CAPACITY 4 CU FT FREE AIR PER MINUTE AT 600 R.P.M.

TOP VIEW

FIGURE I—ELECTRICALLY DRIVEN SUCTION APPARATUS

been used with a high degree of success for the sampling of normal outdoor air, of various industrial dusts, of lead dust, coal dust, of chromic acid mist, of lead fumes, and of sulphur dioxide. The present note is presented at this time so that persons requiring an instrument for the sampling of fumes, gases, smoke or dusts may be familiar with this device.

THE IMPINGER APPARATUS

The impinger apparatus consists essentially of two portions: First, a source of sufficient suction to draw the air to be sampled through the sampling device; and second, the sampling device or impinger itself, which consists of a container and the impinger tube and plate. As a source of suction we have made use of an electrically driven and a compressed air driven apparatus.

ELECTRIC SUCTION APPARATUS

The electrically driven suction apparatus (see Figures I, II and III) is designed to be used in places where electrical energy is available. The motor is a series-wound, single-phase 60-cycle, alternating-current motor of 1/15 h.p., rated at 1.6 amperes, at 110 volts, with a speed of 1,800 r.p.m. and operates on either alternating or direct current. It is geared to a positive pressure blower of the Roots type by means of a set of gears having a 1 to 3 ratio. In order to minimize noise, the smaller of these gear wheels is made of fiber, the larger being metal. The blower is rated at 4 cu. ft. of free air per minute at a speed of 600 r.p.m., and is used as the source of suction. Wired in series with the electric motor is a 98-ohm, 1.6-ampere variable sliding rheostat used for speed control of the motor. By employing such a rheostat, 110 or 200 volts may be used. To the intake or suction side of the blower is attached a ¼" malleable-iron elbow fitting provided with two inlets. To one

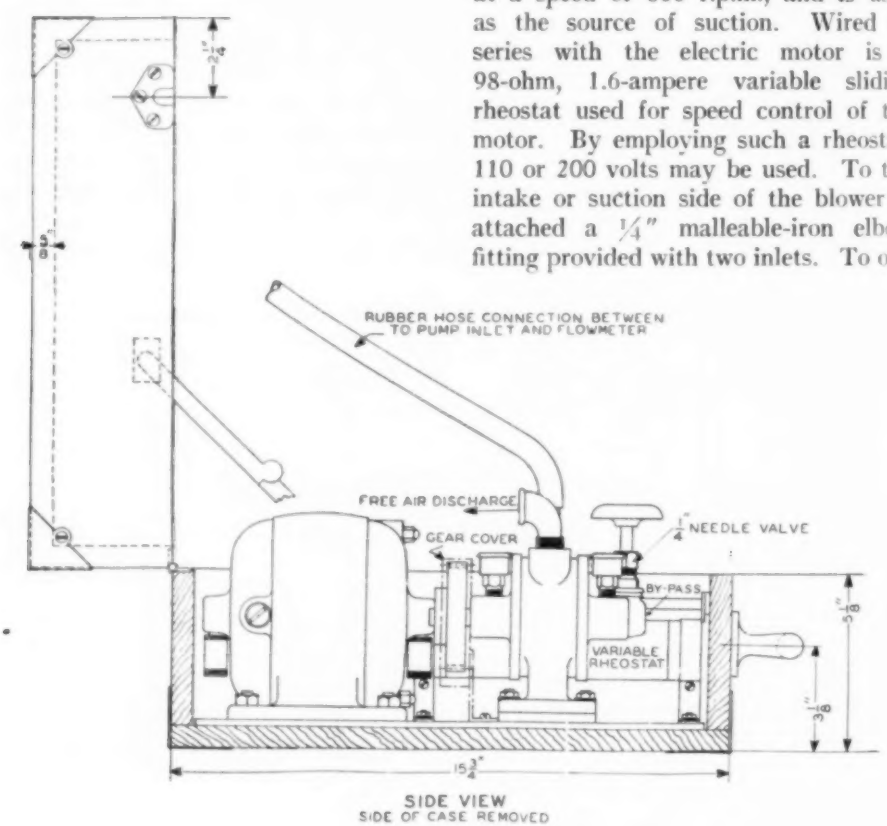


FIGURE II—ELECTRICALLY DRIVEN SUCTION APPARATUS

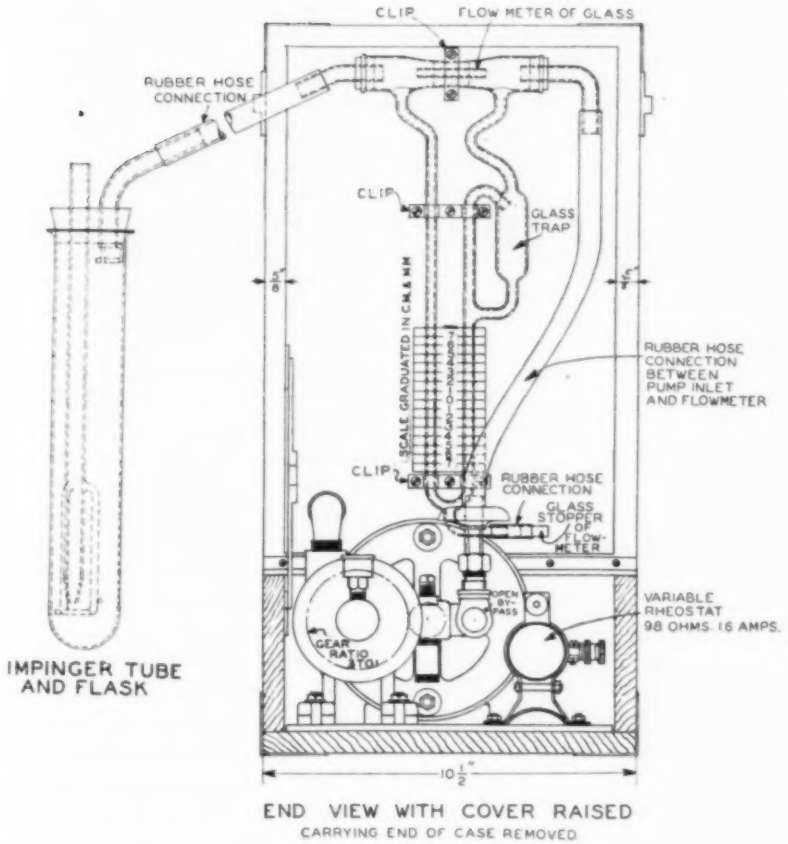


FIGURE III—ELECTRICALLY DRIVEN SUCTION APPARATUS

of the inlets, a ¼" brass needle valve by-pass is attached. The second inlet of the elbow is connected to a constriction type glass flowmeter or vacuum gauge for measuring the rate of air flow. The inlet side of the flowmeter is connected to the sampling flask by means of a piece of non-collapsible rubber tubing, of any suitable length.

The electric motor, blower, rheostat, electric plug, and switch are all assembled on a metal plate 9" by 14" and ⅛" in thickness, and this plate is in turn firmly screwed to the base of the carrying case. The carrying case is made of ½" quartered oak, the outside dimensions being 10½" by 15½" by 9¼". The weight of the apparatus is 45 lb.

COMPRESSED-AIR SUCTION APPARATUS

In many industrial establishments, mines, and quarries, compressed air is readily available. By means of a very simple device called an ejector, the compressed air may be converted into suction which is then used for the sampling of the atmospheric dust (Figure IV).

The inlet (compressed-air) side of the ejector is provided with an adapter so that the usual ¼" nipple, as ordinarily used for small compressed air lines, may readily be attached. To the suction side of the ejector, a ¼" iron tee is attached, and to the outstanding leg of this tee a second tee connection is fitted. To the outstanding leg of the second tee, an ordinary vacuum gauge,

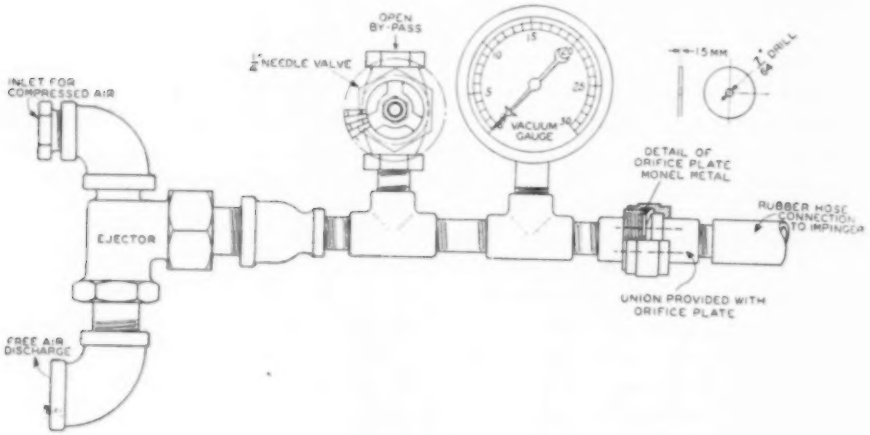


FIGURE IV—COMPRESSED AIR DRIVEN SUCTION APPARATUS

for measuring the rate of air flow, is connected, while to the other leg there is attached an ordinary ¼″ pipe union. Finally, to the unoccupied end of this union is fastened a short pipe nipple over which a suitable length of rubber tubing is attached.

Between the two halves of the pipe union there is placed a Monel metal disk approximately 1.5 mm. in thickness, pierced at its center by a circular orifice 7/64″ in diameter. By employing such an orifice plate, it is possible to obtain a gauge reading approximately double that obtainable without the use of this device.*

The ejector type of instrument weighs approximately 3½ lb.

IMPINGER TUBE AND FLASK

The impinger tube is constructed of a piece of heavy wall pyrex glass tubing 13 mm. in outside diameter, approximately 325 mm. in length (this length is optional), tapered at its lower end to a stream-line form with a terminal orifice of 2.3 mm. diameter. The impinger plate is of pyrex glass approximately 25 mm. in diameter, 3 mm. in thickness and is fastened to the impinger tube by means of three glass supporting rods about 9 cm. in length, so that the distance between the orifice of the tube and the plate is 5 mm. (Figure V).

There is wide latitude in the choice of the sampling flask which may be used in conjunction with the impinger tube. In fact, we have employed three different flasks during the course of our studies. The choice is governed by the

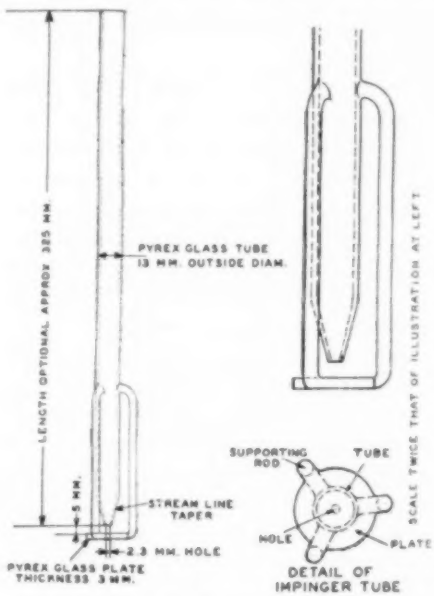


FIGURE V—IMPINGER TUBE

* We are indebted to Theodore Hatch, Harvard School of Public Health, for the design for this orifice plate attachment.

requirements of the particular task at hand.

At the present time we are using a flask made in the form of a tube sealed at the lower end, 300 mm. in length and 50 mm. in diameter, provided with a 2-hole rubber stopper (Figure VI). The outlet tube from the sampling cylinder is connected to the source of suction by means of a convenient length of non-collapsible rubber tubing.

Whether bottle flask or cylinder is used, sufficient liquid should be kept in the container during use to cover the impinger plate to a depth of approximately 3 cm. In the cylinder type of flask 100 c.c. are sufficient to accomplish this, whereas if the Erlenmeyer type of flask is used, 250 c.c. are required. A baffle plate on the exhaust tube, as shown in Figure VI, is of value for the prevention of entrainment of water from the sampling flask.

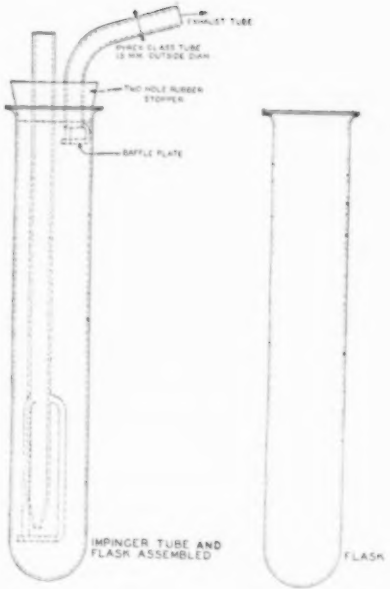


FIGURE VI—GLASS SAMPLING CYLINDER AND COMPLETE IMPINGER

METHOD OF SAMPLING—CALIBRATION OF THE IMPINGER APPARATUS

It is necessary to calibrate the vacuum gauge or flow meter air measuring device of the impinger apparatus so that one may control the rate of air sampling. For calibration, the apparatus should be assembled in a manner precisely similar to that employed in field sampling, but with the outlet tube of an accurate 5-light, dry, test gas meter attached to the inlet of the impinger apparatus. A calibration curve is then obtained, showing the relationship between rates of air flow, as measured by the gas meter during observed intervals of time, and the readings on the scale of the flow meter or vacuum gauge. The scale reading corresponding to 1 cu. ft. per minute may then be ascertained from the calibration curve.

SAMPLING FLUID

The choice of the sampling fluid is dependent on the analyses contemplated. In studies of non-toxic industrial dusts we employ distilled water. In the case of those dusts not easily wetted by water, such as coal dust, a mixture of 25 per cent alcohol and 75 per cent water has been employed with excellent results. The alcohol increases the wetting power of the solution and at the same time greatly reduces the solubility of mineral dusts in water. It is important that the sampling fluid itself be comparatively free from suspended matter.

For the sampling of SO_2, Smith and Friis [4] have employed 0.1 normal sodium hydroxide, and for the sampling of chromic acid mists, Bloomfield and Blum [5] employed normal sodium hydroxide.

In the preparation of the apparatus and solutions for field use the degree of care and the precautions usually exercised in quantitative chemical work should be adhered to.

SAMPLING AND ANALYSIS OF DUST SAMPLES

In the field the apparatus is assembled and set up in a suitable place, the proper

amount of sampling fluid is placed in a flask and the impinger tube is placed in position. The flask, with its tube, is then placed in the chosen sampling position and the suction is started. It is important to note that sampling should be carried out at a rate of 1 cu. ft. per minute since the dust catching efficiency of the instrument is decreased when a lesser sampling rate is used. After a suitable period of time the instrument is shut down, the impinger tube is rinsed with distilled water, the rinsings being added to the original sampling fluid, and the flask stoppered for transport to the laboratory.

In the laboratory the dust suspensions are filtered through a 325-mesh screen and then diluted so that the number of particles in the microscope field is equal to approximately 50 to 75. Two or more 1-c.c. portions are placed in Sedgwick-Rafter cells for counting. The microscope is of the ordinary type employing a 7.5 x eyepiece and a 16 mm. objective. A Whipple disc eyepiece micrometer is placed in the microscope eyepiece and the microscope tube length is adjusted so that the side of the ruling in the eyepiece is 1 mm. in length. As a source of illumination we employ the ordinary type of microscope lamp with the iris of the Abbé condenser system adjusted so as to provide a high degree of visibility. In making counts the microscope should be focused throughout the depth of the cell, since some particles may remain in suspension. It is, of course, necessary to make control dust counts on the sampling fluid.

NOTE: For a more complete description of the counting technic the reader is referred to the contribution in the *Public Health Reports* of March 18, 1932.

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2. Greenburg, L., and Smith, G. W. A New Instrument for Sampling Aerial Dusts. Bureau of Mines, *Reports of Investigations No. 2392*, Sept., 1922.

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4. Smith, R. B., and Friis, B. S. T. Portable Motor-driven Impinger Unit for Determination of Sulphur Dioxide. *J. Indust. Hyg.*, 13, 10:338 (Dec.), 1931.

5. Bloomfield, J. J., and Blum, William. Health Hazards in Chromium Plating. *Pub. Health Rep.*, 43, 36:2330 (Sept.), 1928.

JOINT STATEMENT OF AMERICAN WATER WORKS ASSOCIATION AND AMERICAN PUBLIC HEALTH ASSOCIATION ON PROCEDURE FOR ISSUING *STANDARD METHODS FOR THE EXAMINATION OF WATER AND SEWAGE*

THE importance of a standard laboratory technic for examination of water and sewage is recognized by all. The mechanics of reaching agreement upon such standard methods, however, is not so generally understood or accepted. Varied interests, conflicting opinions, prejudices of one kind or another, and the sheer mechanical difficulty of reconciliation of many groups have retarded increasingly in recent years the prompt issuance of a manual acceptable to the field at large. Some of this delay has been due to frank differences of opinion regarding choice of technic, but a much greater part has had its origin in administrative obstacles to agreement, to lack of opportunity for direct personal contact for exchange of ideas by members of the responsible

committees, and by research committees attempting to function as executive agents.

The increasing dissatisfaction of many workers in the field with the current standards and the unfortunate departure of many important laboratories from the use of *Standard Methods* made it essential for both the American Public Health Association and the American Water Works Association to find some procedure for facilitating the prompt issuance of *Standard Methods,* commensurate with the current acceptance of new or modified procedures. A review of the situation by interested groups disclosed quite clearly that the most fruitful direction for bringing about this desideratum was in the creation of a small, compact, editorial committee, distinct from the investigating committees, whose sole function should be the crystallization of current thought and data into prompt publication for use. The basis for the operations of this committee naturally remains in the research groups of the respective associations, but the mechanics of formulation of technic was regarded as more likely to be efficiently performed by a small group than by large, discrete, and loosely knit research committees. Their functions likewise were thought to be quite distinct.

In the light of these conclusions, it appears advisable to inform the membership of the American Public Health Association and the American Water Works Association as to the changes which have been made in personnel for and methods of preparation of new editions of *Standard Methods for the Examination of Water and Sewage.*

By an agreement which became effective in 1925, this manual of methods, which had formerly been prepared by the American Public Health Association alone, became the product of the coöperative activity of the two associations. Since that time certain administrative reorganization has taken place or became effective in both associations.

In the American Public Health Association, the Committee on Research and Standards has become the clearing house through which proposals for research projects are routed and to which the Association as a whole looks for coördination and direction of all research work. In the American Water Works Association the Committee on Water Works Practice occupies a similar position and performs a similar function.

While it is doubtless unnecessary to point out to most workers in this field, it may be worth while, for the benefit of a few who may not have thought the subject through, to recall that the establishment of such associational clearing houses of research and group activity is becoming more widespread and has its highest development in certion national organizations most conspicuous for their activity and excellent performance.

The chairmen of the two associations' committees, after a review of the progress that was being made under the 1925 joint editorial agreement, have obtained the approval of their respective boards of directors to a reorganization of the groups engaged in editing *Standard Methods.*

This reorganization consists briefly in the appointment of a joint Editorial Committee of six—three from each association—who have organized and have been functioning as a single committee since the Memphis Convention of the American Water Works Association.

The members of the Joint Editorial Committee are:

American Public Health Association
John F. Norton, Detroit, Mich.
A. M. Buswell, Urbana, Ill.
L. M. Wachter, Albany, N. Y.

American Water Works Association
Wellington Donaldson, New York, N. Y.
Paul Hansen, Chicago, Ill.
Chairman: Harry E. Jordan, Indianapolis, Ind.

This joint committee is empowered to carry on all the negotiations incidental to the preparation of new and revised editions from time to time, to the point of detailed and complete formulation of manuscript. After the completion of such manuscript, the material is to be submitted to the two parent associations for the detailed ratification which those associations may determine upon in their own practice. Funds have been allotted for the work of the committee.

In the American Water Works Association the manuscript will be submitted to the Chairman of the Committee on Water Works Practice who will, after satisfying himself and his committee, through whatever channels appear wise, as to the character of the material submitted, approve it and forward it to the Secretary of the association. A like copy of the manuscript will be forwarded to the Chairman of the American Public Health Association Committee on Research and Standards. He will obtain the approval of the manuscript by his committee, after similar intra-association review, and forward the material to the Secretary of the A.P.H.A.

The approved manuscript is then to be printed and bound under the direction of the General Secretary of the A.P.H.A. An annual accounting for expenses and receipts connected with the preparation and sale of *Standard Methods* will be made by the secretaries of the two associations.

It is planned that such research on methods as may be organized in the A.W.W.A. shall take the form of appointments by the Chairman of the Water Purification Division with the advice of the Joint Editorial Committee and the approval of the Committee on Water Works Practice. Whenever it becomes evident to the Editorial Committee that a revision of an item of current procedure is needed or whenever the members of the Water Purification Division in regular meeting by their action indicate a similar conclusion, a research or revision group may be organized to study the particular subject. Such research groups are to be appointed for 1 year only, and will be expected to make a report at a regular meeting of the division. If, in the opinion of the Joint Editorial Committee, it is evident that the study has not reached a status that justifies a change in current procedure, the research group may be reappointed for another year with such additions to or changes in personnel as may be indicated. The policy of a definitely limited term of appointment of research groups is adopted as a means of accelerating results rather than of restraining the activities of any individual or group.

On the other hand, the Joint Editorial Committee is charged with the responsibility of contact with all research wherever organized as it may relate to the subject matter of *Standard Methods*. Whenever it becomes evident that the validity of research by any person or group is amply demonstrated, it is expected that a proper change will be made in the text of *Standard Methods*.

While the standing of the text on *Standard Methods for the Examination of Water and Sewage* has rested in the past upon its adaptability to the determination of the sanitary and chemical characteristics of natural waters or those only slightly changed from their natural condition, it has become evident that the text should include data concerning determinations on highly modified waters for steam boiler purposes.

The Joint Editorial Committee is already in agreement with the Chairman of the A.W.W.A. Committee on Boiler Feed Water Studies, that whenever his committee is in agreement as to the technic of such determinations, the Joint Editorial Committee will expand *Standard Methods* to contain the material.

The Joint Editorial Committee will endeavor to keep adequately informed as to the activities of water quality research committees in the National Electric Light Association, American Gas Association, American Railway Engineering Association, American Society for Testing Materials, and other organizations of similar scope.

Its coöperation with the Committee of the American Chemical Society and the Society of American Bacteriologists is thoroughly established. Contact has already been established with the Laboratory Methods Coördination Committee of the Great Lakes and Ohio River Board of State Sanitary Engineers. It is anticipated that, whenever the Federation of Sewage Works Associations organizes research studies on methods applicable to the sewage field; the fullest harmony will exist and that whenever new or modified methods are developed, they will be readily accepted by the Joint Editorial Committee for inclusion in *Standard Methods*.

A new edition of *Standard Methods* will issue this autumn, and it is anticipated that, with the coöperation of the various research committees, future revisions will appear as promptly as the extent of revised material justifies the expense of a new edition.

ABEL WOLMAN, *for the Committee on Research and Standards—A.P.H.A.*
MALCOLM PIRNIE, *for the Committee on Water Works Practice—A.W.W.A.*

VITAL STATISTICS

Vital Statistics for West Virginia, 1931—There were 39,325 births reported in West Virginia during 1931. The birth rate was 22.4 per 1,000 population, by far the lowest rate since 1925, when West Virginia was admitted to the registration area. At that time the birth rate was 27.7. Of the total number of births in the state, 94.7 per cent were among the white population and 5.3 per cent among the colored. The stillbirth rate, 38.8 per 1,000 live births, was higher than in 1930 when it was 37.1.

In 1931 there were 17,620 deaths from all causes, 600 less than in 1930, the death rate in 1931 being 10.0 per 1,000 population as compared with 10.5 in 1930. Among the notifiable diseases, typhoid fever (showing a death rate of 12.7 per 100,000 in 1931), diphtheria (9.3), influenza (34.0), and poliomyelitis (1.3) showed increases over the 1930 rates, while measles (2.3), scarlet fever (1.7), whooping cough (7.5), and tuberculosis (60.1) showed declines in 1931 over 1930.

Among the principle causes of death, the mortality from cancer (all forms) decreased from 59.7 per 100,000 population in 1930 to 58.6 in 1931. The fact that there was a decrease instead of an increase in cancer mortality is noteworthy, especially in view of the strikingly low rate which West Virginia showed in 1930.

Diseases of the heart declined from 117.0 in 1930 to 111.3 in 1931 and diseases of the circulatory system from 146.3 to 130.4 for the same years respectively. A marked decline is shown for diarrhea and enteritis under 2 years, the rate for 1931 being 54.6 as compared with 70.3 for the previous year. The maternal mortality rate was 5.2 per 1,000 live births. In 1930, it was 5.6. The largest percentage of puerperal deaths was due to septicemia. Apoplexy (68.3 in 1931), diseases of the nervous system (95.3), alcoholism (5.1),

nephritis (64.9), and syphilis (9.5) showed increases over the rates for 1930.

The infant mortality rate for the state as a whole, during 1931, was 77.2 per 1,000 live births, as compared with a rate of 80.9 in 1930. Five counties, Clay, Tucker, Jefferson, Mineral, and Wirt, showed infant mortality rates of over 100.—*West Virginia Quart. Bull.*, 19:4–6 (July), 1932.

Accidental Deaths Drop 2,000 in 1931—Accidents in the United States during 1931 caused approximately 97,000 deaths and 10,000,000 non-fatal injuries.

Staggering as the figures sound, the fatality total is 2,000 less than in 1930 and 1,000 less than in 1929. The reduction from 1930 is accounted for by a net decrease of 1,500 industrial deaths and of 1,000 home fatalities. Motor vehicle accidents caused 500 more deaths in 1931 than in the previous year. Incidentally, this reduction in the total accidental deaths is the first reduction that has been recorded since 1922. The death rate stood at 78.2 per 100,000 population in 1931, the lowest rate since 1925 when the rate was 75.7. The accident rate in the United States is still three times as high as that of Denmark, approximately twice that of Japan, and 50 per cent higher than that of France.

Steam railroads established an all-time safety record in 1931. There were fewer fatalities during the year than in any year since 1888, when the Interstate Commerce Commission's records begin. There were 5,099 deaths last year, compared with 5,481 in 1930.

Approximately 33,500 deaths occurred in motor vehicle accidents during 1931. This may be contrasted with 32,929 in 1930, 24,430 in 1926, and 13,939 in 1921. Of the 45 states reporting on motor vehicle deaths, 27 participated in the upward movement. Largest increases occurred in Nevada, Wyoming, and Montana. Among the states showing declines, New Mexico and Arizona lead the list with drops of 35 and 14 per cent, respectively. Pennsylvania, Ohio, and Michigan, among the larger states, also had fewer deaths in 1931 than in the previous year. Based on the provisional figures, Nevada has the highest 1931 death rate, with California second. North Dakota has the lowest rate—15.5 per 100,000 population—followed closely by Mississippi, South Dakota, Oklahoma, and Louisiana.

Urban states (60 per cent or more city population) show the smallest increase in motor vehicle deaths, 1.4 per cent, from 1930 to 1931. Rural states (60 per cent or more rural population) show an increase of 1.6 per cent, whereas states between these extremes show the largest increase, 2.2 per cent.

The seriousness of the motor vehicle accident problem is emphasized by comparison with homicides and suicides. The latest available figures show that more than three times as many persons are killed by motor vehicles as meet death at the hands of criminals. This difference has developed during the past decade; the homicide rate has increased from 7.1 to 8.4 deaths per 100,000 population since 1920, whereas the motor vehicle death rate increased from 11.8 to 25.7—118 per cent.

Detailed information on 1930 accidental deaths indicates that school children are continuing the outstanding progress in safety that has been going on since 1924. The accidental death rate for persons of all ages increased from 69.6 in 1922 to 80.6 in 1930, an advance of 16 per cent. Among children between the ages of 5 and 14, however, the death rate was only 36.03 in 1930 compared with 40.08 in 1922, a decline of 11 per cent. The rate for children under 5 declined 5 per cent in the same period. The contrast is even more striking for deaths from automobile accidents. This rate for persons

of all ages advanced 98 per cent during this time while the rate for school children advanced only 4 per cent. For children under 5 there was an increase of 45 per cent.

Of the 30,000 deaths in homes in 1930, nearly 12,000 are charged to falls, and of these 8,000 were among persons 65 years of age or over. Burns and scalds are about half as important as falls, and the deaths from this cause are concentrated at the earlier ages, nearly one-half of all deaths occurring among children under 15.

The death rate from drowning in 1910 was 9.0 and reached a maximum of 10.2 in 1913. It then dropped to a low rate of 5.7 in 1920 and has since fluctuated considerably, the 1930 rate being 6.1. Firearms also cause a fair share of the public accidental deaths. The greatest hazards are to young men, about one-third of the annual total occurring in the age group 10 to 19 and another 20 per cent in the age group 20 to 29.

Deaths in aviation accidents increased to a new high total of 620 in 1930. Final Bureau figures are not yet available for 1931, but there is every indication that there was a decrease last year. In civil aviation accidents only, as reported by the Aeronautics Branch of the U. S. Department of Commerce, there was a decline from 529 deaths in 1930 to 439 in 1931. If a similar decline occurs for all aviation, the deaths will number slightly more than 500. On the basis of miles flown, scheduled air transport operations continue to show much greater safety than miscellaneous flying. —R. L. Forney, Accident Deaths Drop 2,000 in 1931, *National Safety News*, 26:34–38 (July), 1932.

Preliminary Report on Marriage and Divorce for the United States, 1931—The U. S. Bureau of the Census announces that, according to the returns received, there were 1,060,095 marriages performed in the United States during the year 1931, as compared with 1,128,572 in 1930. These figures represent a decrease of 68,477 or 6.1 per cent. There was a decrease of 8.4 per cent from 1929 to 1930. During the year 1931, there were 183,695 divorces granted in the United States, as compared with 191,591 in 1930, representing a decrease of 7,896 or 4.1 per cent, as against a decrease of 4.9 per cent from 1929 to 1930. There were 4,338 marriages annulled in 1931, as compared with 4,370 in 1930.

The estimated population of continental United States on July 1, 1931, was 124,070,000, and on July 1, 1930, 123,191,000. On the basis of these estimates, the number of marriages per 1,000 of the population was 8.5 in 1931, as against 9.2 in 1930; and the number of divorces per 1,000 of the population was 1.49 in 1931, as against 1.56 in 1930.

While the net decrease in the number of marriages performed in the country as a whole was 6.1 per cent, the relative change in the different states ranged from a decrease of 49.7 per cent in Idaho to an increase of 25.1 per cent in Nevada.

Only 11 states reported increased marriage rates with percentages as follows—New Hampshire 7.6, South Dakota 7.8, Nebraska 7.6, Maryland 0.5, Virginia 6, West Virginia 2.4, South Carolina 1.5, Florida 1.1, Kentucky 9.7, Utah 1.6, and Nevada 25.1.

Of these, 8 adjoin states in which recent changes made in the marriage laws, require from 3 to 5 days to elapse between the application for a marriage license and the issuance of the same. South Dakota adjoins Iowa, change effective July 1, 1931; Minnesota, April 29, 1931; and Wyoming, June 1, 1931. Nebraska also adjoins Iowa and Wyoming. Virginia and South Carolina border North Carolina and Tennessee where restrictions became effective July 1, 1929. West Virginia is a neighbor to

Ohio where the change became effective July 23, 1931. Kentucky adjoins both Ohio and Tennessee. Utah borders Colorado, change effective September 1, 1931; Idaho, March 16, 1931, and Wyoming; while Nevada adjoins Idaho and California, where the change was made July 29, 1927. Of the remaining 3 states, Maryland has long been a Gretna Green for adjoining Delaware where restrictions have been in effect for some years and Florida borders Georgia where restrictions are in effect for persons under 21 years of age. New Hampshire, however, not only adjoins states where the 5 day interval must elapse but carries the same law on its statutes.

The changes in the various states as regards the number of divorces in 1931 as compared with the year 1930, ranged from a decrease of 26.4 per cent in Mississippi to an increase of 101.6 per cent in Nevada. Increased rates for divorces were reported in 11 other states, New Hampshire, Connecticut, New York, New Jersey, Wisconsin, North Dakota, South Dakota, Georgia, Kentucky, Wyoming, and Utah. The number of divorces granted in the District of Columbia more than doubled, due to increased court facilities. The rate was not computed, however, as the number reported for 1930 was less than 100.

In 1931, for the United States as a whole, 5.8 marriages for each divorce were reported, as against 5.9 in 1930. The District of Columbia and New York State, each having but one cause for absolute divorce, reported 24.7 and 22.4 marriages to each divorce, respectively, while the rates in the states ranged from 12.1 marriages to each divorce in Georgia to 1.5 marriages to each divorce in Nevada.—Dept. of Commerce, Bureau of the Census, Press Summary (July 18), 1932.

Cancer in Australia—The report of the Second Australian Cancer Conference held at Canberra in March, 1931, gives some details of the history and epidemiology of cancer in Australia which are not without interest. The total mortality from cancer in the Commonwealth has risen steadily from 34 in 1879 to 98 in 1929. In New South Wales, Victoria, and South Australia, statistics going back to 1859 are available. In 1859 the rates for the three countries were 14, 10, 10, respectively. There was a great jump in the next 10 years to 25, 27, 15 and in 1929 the rates had reached 95, 107, 109. In Western Australia the rate has risen from 4 in 1869 to 92 in 1929.

In the 19th century cancer was less common in Australia than it was in Europe, and it is still less common, though its acceleration has been more rapid and probably by the end of next year the Australian rate will be little if any below that of Britain, viz., 147. During the 10 years 1920–1929 the Commonwealth rate has increased from 84 to 98, not quite regularly. During this period no alteration of certification has taken place, nor has significant improvement of diagnosis occurred. On the other hand, treatment has improved, so that the incidence rate (which is unknown) must have increased more rapidly than the mortality rate.

In some sites, cancer has declined both absolutely and relatively to other sites. Cancer of the tongue in males is falling; in females it is increasing, but it is still so uncommon in the fair sex that even a continent cannot give a significant figure. Cancer of the womb is rising, but less rapidly than in other sites. Cancer of the anus and rectum doubled in males and increased 60 per cent in females between 1908 and 1929, while the disease in the whole digestive tract has risen from 25.2 to 51.4 in males and from 20.1 to 34.3 in females during the same period. Mortality from cancer of the skin is stationary as it is everywhere; probably incidence has increased

but treatment has improved to balance it.

Research in cancer is proceeding in Australia as it is elsewhere and much upon the same lines and with the same results. Experimental work on cancer is characterized not by failure but by confusions. Australian figures show that though "carcinoma" (including scirrhus) has increased in rate from 26.1 in 1908 to 69.5 in 1929, the rates for epithelioma, rodent ulcer, and sarcoma have remained constant. The whole increase in cancer in all sites in all countries is in "glandular" cancer—other forms of malignant disease have shown no change in incidence.—*Med. Off.*, 48:3 (July 2), 1932.

PUBLIC HEALTH ENGINEERING

REFUSE DISPOSAL IN THE CITY OF VIENNA

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THE collection and disposal of refuse naturally bear a certain relation to health conditions. While in most American cities the care of garbage and other house refuse is now ordinarily under the control of a branch of the city government separate from the health department, or is let out to private contractors, nevertheless the health officer is frequently called upon to express an opinion regarding particular measures advocated, and in some instances at least must actually supervise work along this line. For these reasons, therefore, he should be acquainted with the various aspects of the refuse disposal problem.

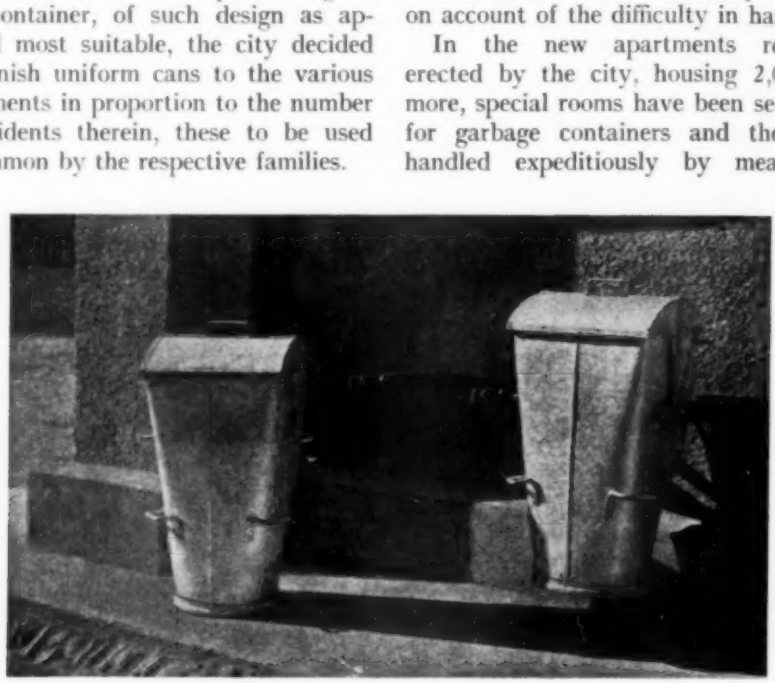
In general it may be said that European cities have progressed further in the handling of refuse than American communities. Perhaps one should also add that refuse is less a problem in Europe than in America, there being a number of reasons for this.

First, the fuel consumption per person is higher with us than in Europe, with a corresponding increase in the output of ashes. Second, we are more wasteful than our cousins across the water, the European housewife being horrified when she inspects an American garbage can. Third, such rubbish as newspapers, discarded magazines, tin cans, and the like, in America exceeds by far the amount of similar material in an average European city.

In 1928 the city of Vienna completed the introduction of a system of garbage collection which has many advantages over the haphazard methods which often prevail. Prior to this time the refuse was collected in open wagons, the driver announcing his arrival by the sounding of a gong, whereupon the respective maids of the various tenants rushed to the street carrying containers of one sort or another for emptying. At its best the old system was more or less unsightly, resulted in disagreeable odors, and disseminated the maximum amount of dust. Before introducing the present system the situation was carefully investigated in order to avoid mistakes and to determine what appeared most desirable from an economic and sanitary standpoint.

The new method provides for the handling of refuse by the city without

cost to the individual householder. Instead of each household purchasing its own container, of such design as appeared most suitable, the city decided to furnish uniform cans to the various apartments in proportion to the number of residents therein, these to be used in common by the respective families.



TYPE OF CONTAINER IN USE

The choice of location of the garbage cans is determined upon following a conference of the representative of the city with the house administrator or janitor. It is of course desirable that the containers be easily accessible not only to the householder but also to city employees, and that the carrying distance to the sidewalk be relatively short.

Eighty-nine per cent of all receptacles are located either in the garden or the hof, the latter being the central space around which European apartments are usually built. Five per cent are at the entrances, another 5 per cent are either in cellars or other space below the street level, and the remaining 1 per cent are distributed in miscellaneous places. Inasmuch as the cans are seldom if ever unsightly from overflowing or from the scattering of waste, their location in the hof or near the entrance of buildings is less objectionable than one would imagine. The placing of the units in cellars or basements is naturally avoided on account of the difficulty in handling.

In the new apartments recently erected by the city, housing 2,000 or more, special rooms have been set aside for garbage containers and they are handled expeditiously by means of electric trucks. The walls of such rooms are tiled, the illumination is adequate, and satisfactory ventilation is secured by means of electric exhausts, so that disagreeable odors are not in evidence.

All cans throughout the city are raised at least 6 inches from the floor or ground level by means of a metal frame of substantial construction built into the wall of the house, the upper handles of the container fitting into corresponding niches in the arms of the frame. The purpose of this elevation is threefold. It enables the householder to maintain a high degree of cleanliness, as the area around and underneath the containers is thus easily swept, and further prevents upsetting with consequent dumping of contents. It also effects a considerable saving by preventing deterioration through the action of snow and rain.

The cans are constructed of somewhat

heavier metal than is customary in America; hence long life with absence of leakage is assured. Reference to the accompanying illustration will show their general character. The two handles on each side, the lower set being placed anterior to the upper, facilitate handling, especially when the receptacles are lifted to the wagons.

The cover is the distinguishing feature of the container. Instead of being removable it is attached to the main body of the can by an arm or radius in such a manner as to slide backwards or forwards by traction on the fifth handle. The cover is so tightly fitted that access of rodents is prevented. Flies are also discouraged from entrance, as the only way they can reach the contents is by crawling through the narrow space between the cover and the side. However, the body of the container is ribbed at its upper edge, so that this space is considerably narrower than it appears. A small projecting arm on each side enables the can to be suspended to the corresponding unit of the collecting wagon.

No separation of the refuse into its various constituents, ashes, table waste, and papers, is attempted, all going into the same receptacle. Chemicals, fluids, and excessive amounts of animal waste from butcher shops and the like are prohibited.

The collecting part of the system consists of two conveyors or wagons detachable from the hauling unit. While such a train is less easily manipulated, especially in narrow streets, than a single truck, the authorities claim that the motor unit is more frequently out of service through mechanical defects than the trailers, therefore a saving is effected.

Each trailer is equipped with a series of twelve closed receptacles or units, corresponding closely in size with the cans, leading into the main undivided body of the wagon. The can is lifted from the curb to the most convenient receptacle by two men, is suspended on projecting hooks, and is then tilted. The tilting simultaneously retracts the cover to the can and pushes back the cover of the receptacle, so that the contents are emptied without dust, unsightliness, or other objectionable feature, the entire procedure occupying only a few seconds.

The collecting wagons have a personnel of 5, not including the driver. Two men precede the trucks and bring the containers to the curb, 2 men attend to the emptying, and the 5th, equipped with a hooked strap hung over the shoulders, returns the cans, two at a time, to the racks. In this manner neither the filled nor empty containers remain for any considerable period on the street.

On financial grounds, collection is only possible once in 10 days. It is realized that this interval is too long and an attempt will be made to shorten the period to 1 week. Hotels and institutions are provided with a shorter service.

The ultimate disposal of the refuse is by dumping at a point within easy reach of the center of the city. Naturally, this method is objectionable, but money has not been available for the erection of incinerators. When the present dump is filled, estimated to require 4 years, the cost of the longer haul will probably exceed the cost of incinerators, therefore incineration will be provided for on economic grounds.

Upon reaching the dump the refuse wagons run upon a trestle and their contents are discharged into smaller cars below, these cars being hauled by a caterpillar tractor to the outer limits of the dump.

Glass, metal and cloth are sorted out, the contractor paying approximately $7,000 a year for the privilege. On account of smoke, burning is not attempted. Similarly, no effort is made to limit the breeding of flies by cover-

ing with earth, but the usual petroleum compounds are used, especially in years when flies are prevalent. Complaints of insanitary conditions, less perhaps of odors than of flies and rats, are of course received.

Altogether, the care of refuse in the homes, and the collecting system, are about as satisfactory as one could desire. The standing of boxes, pails and containers filled with rubbish on the sidewalks awaiting collection has been entirely eliminated. There is no dust during the emptying process or when the trucks are driven through the streets, even on windy days. Sometimes a workman will retract the cover to the can to determine if it has been completely emptied, and a small amount of dust will result, but such action is not necessary. The rubbish cannot be seen, which is of course a decided advantage.

The cost has not been excessive. Roughly, Vienna pays $825,000 annually for this collecting system, which amounts to $.45 per person. Based upon the number of cans emptied, each of which holds 90 liters, the cost has been $.13 per unit. In making estimates for the United States the difference in the quantity of refuse must be considered, as well as the price of labor, the average Viennese worker receiving $11 weekly.

There are approximately 180,000 cans in service, costing $4.50 each. An increase of from 3 to 5 per cent in the amount of garbage is noted yearly, and the difference between the summer and winter amounts is around 20 per cent. Only 30 of all the receptacles in use have been lost during the past 3 years. A shop where the cans are washed and renovated, is maintained.

The writer knows of no reason why a garbage collection system such as the foregoing, the advantages of which are at once apparent, is not feasible in the average American city.

COLLECTING WAGONS

INDUSTRIAL HYGIENE

Compensation for Silicosis in New South Wales—Summary: The workmen's compensation law of New South Wales is exceptional among the workmen's compensation laws of British dominions in that it contains no schedule of "industrial diseases," but covers injuries by disease in indefinite terms. Under that law, compensable injury includes

> . . . a disease which is contracted by the worker in the course of his employment . . . and to which the employment was a contributing factor, but does not include a disease caused by silica dust.

Under this provision, the practice has developed of referring claims for injury by disease to, and for determination by, medical boards or a medical referee. In the fiscal year 1930–1931 there were 165 awards for diseases in comparison with 27,180 awards for accidents. The preceding matter refers to the general law. In addition, under special provisions of law, there have been organized schemes insuring medical benefits and compensation for certain pulmonary diseases to workmen employed in a few specified occupations in several localities.

The *Fifth Annual Report* of the Workmen's Compensation Commission of New South Wales, for the year ending June 30, 1931, gives a significant account of the operation of "Workmen's Compensation (Silicosis) Scheme, No. 1," from its initiation September 16, 1927, to June 30, 1931. This scheme of providing medical benefits and compensation for silicosis, which is publicly administered, covers stone masons, quarrymen, rock choppers, and sewer miners in the County of Cumberland only. Workmen examined during that period numbered 2,231, of whom 113 were suspended upon initial examination; 117 were found to be suffering from silicosis to a dangerous degree; 88 were found to be suffering from it but not to a dangerous degree; 1,899 were found to be free from the disease; and 14 examinations were pending.

The original plan of finance called for contributions from employers of 3 per cent of wages and equal contributions by the State; but the State has been backward about paying up. Assuming that the employers and the State both contribute in full, it is estimated in the report that, for the year 1931–1932, a current cost deficit of £7,303 will be incurred, and that, at the end of the year, there would remain outstanding contingent liabilities of approximately £44,372. An increase in the rate of employers' contributions to 5 per cent is suggested, but it is intimated that even such increase in contributions would not be adequate without increased help from the State.

The data in this report, just cited, are rather incomplete and somewhat speculative, but they indicate that the cost of compensating for silicosis (which is additional to the cost of compensating for injuries covered by the general compensation law) is running up to nearly 10 per cent of wages. In consequence of this discouraging experience, a movement to extend this scheme of compensating for silicosis to cover all New South Wales has subsided.

The lesson of this seems to be that permanent disablement by silicosis is not a matter for compensation but for the strictest prevention—by frequent medical examinations to eliminate from employment in the occupations subject to such disease all persons predisposed

to pulmonary troubles or manifesting the first symptoms of such troubles.

The only practicable alternative seems to be to condition the right to compensation for disablement by silicosis upon at least 5 years' exposure to the risks of the occupation and upon truthful answers to interrogatories as to previous health and employment, and, then, for the compensation insurance carrier or carriers to insist upon periodical medical examination of employees in occupations exposed to the disease, with a view to the early elimination from the occupation of all workers manifesting the first symptoms of any pulmonary weakness.—*Bull. Assoc. of Casualty & Surety Executives*, No. 30: 6–7 (June), 1932. E. R. H.

Dust as an Industrial Hazard—This is a rapid survey of the various phases of dust as an industrial problem.

The kinds of dust are classified as poisonous and non-poisonous, the latter subdivided into organic and inorganic, or mineral. The mineral subdivision includes (1) non-silica dust such as coal and lime; (2) combined silicates such as clay, talc and feldspar, and (3) silica which may exist as pure silicon dioxide or sand, granite, quartz, and the various kinds of sandstone. There is some difference of opinion as to whether combined silicates and silica can be considered non-poisonous. Evidence would in recent years attribute its harmful influence to chemical properties.

There is a brief discussion on what happens to inspired dust (with an accompanying sketch of lung cell in relation to blood and lymph vessels). The findings of Mavrogordato, Collis, and Heffernan are cited. Asbestos is also referred to.

The chief discussion concerns silicosis in respect to four important points: (1) particle size; (2) number of particles per cu. ft. of air; (3) mineral composition of the dust; and (4) the length of exposure. As a general statement, if the silica content of any given dust is 35 per cent, the standard of safety can be placed at approximately 15 millions particles per cu. ft. of air in the breathing zone of the workmen. If the dust has a silica content of 70 per cent, the margin of safety will be approximately 7½ million particles. At 90 to 100 per cent of free silica, as in the case of sand blasting, the standard is placed at approximately 6 million particles.

Methods of protection, legislation in certain Canadian provinces and the fact that 6 states in the United States cover silicosis (in compensation matters) are pointed out. These states are California, Connecticut, Maryland, Massachusetts, North Dakota, and Wisconsin. Hawaii is also included.—C. O. Sappington, *Industrial Health Digest*, Natl. Safety Council, 20 North Wacker Drive, Chicago (Mar. and Apr.), 1932.

E. R. H.

Department of Industrial Hygiene—Dr. Mavrogordato states that investigations were carried out in association with a Joint Committee of the Mines Department and the Chamber of Mines that has been attempting to work out improvements in the method of estimating air-borne dust as at present in use on the gold mines of the Witwatersrand.

The gravimetric method as at present used does not deal with a sufficient volume of air to meet existing conditions, while the konimetric method is unsatisfactory because total air-borne dust and air-borne phthisis-producing or "intractable" dusts vary independently. Methods have been devised for so treating the konimeter-spot that dust, other than "intractable" dust, is eliminated. Several preliminary reports have been submitted.

At the International Silicosis Conference held during the year at Johannesburg, it was agreed that none of the

existing methods of estimating air-borne dust met present-day needs, and South African workers were invited to devise a method of dust-estimation that could be standardized for general use. This investigation will shortly be in hand.—*Ann. Rep. South African Institute for Medical Research, for the year ended December 31, 1930,* Johannesburg (1931), pp. 24–25. E. R. H.

Investigation of Air Outlets in Class Room Ventilation—In this study the air passing out of school room ventilation outlets was determined. It was found to be 55 per cent of the computed value for buildings of comparatively poor design from the viewpoint of air leakage and 75 per cent in buildings of good construction. The study of window ventilation showed an inflow on both windward and leeward sides ranging from 200 to 500′ per minute.—G. L. Larson, D. W. Nelson, and R. W. Kubasta—*Heating, Piping & Air Conditioning,* 4, 7: 509–515 (July), 1932. L. G.

The Health of the Industrial Worker—This paper is from the viewpoint of disease compensation.

Modern industry has conferred benefits on the human race, whether estimated by improvement in health, or by increase in population. Nevertheless, occupational hazards exist, which determine the occurrence of various kinds of incapacity; for these occurrences compensation is awarded. They weigh heavily upon some industries, foremost among which stands coal mining. Here miners, who only comprise 12.5 per cent of insured persons, account for 42 per cent of claims for accidents, and for 86 per cent of claims for diseases; while 23 per cent of these miners claimed compensation in some form in 1929.

Among diseases not peculiar to the province of coal-mining, inflammations of the skin and skin-cancers are calling for increasing notice, and pointing to the way in which cancers originate.

The dust-disease, silicosis, which is dealt with separately under the Compensation Act, is likely to be found the most serious of all occupational diseases when reliable records have been amassed.—Edgar L. Collis, University of Wales, *J. State Med.*, 40, 2:96–105 (Feb.), 1932. E. R. H.

Hygienic Instructions for Working Men—These instructions cover many special situations in industry and refer to food, water drinking, clothing, fresh air, recreation, bathing and personal hygiene, sleep, care of teeth, constipation, colds, and headache.—May R. Mayers, *Indus. Bull., New York Dept. of Labor,* 11, 7:225–226 (Apr.), 1932. E. R. H.

The Program of the Department of Labor and Industry for the Prevention of Industrial Disease—Among features discussed are the following measures adopted by the Industrial Board as of April 15, 1932:

> All dust, fumes, vapors, gases, fibres, fogs, mists, or any other atmospheric impurities that, in connection with any process of manufacture or use, are created in, emitted into, or disseminated through areas where persons are employed, in such quantities as in the judgment of the department, would (or might) tend to injure the health of employees, shall be removed by means of suction devices at their point of origin or by other methods acceptable to the department.
>
> When required by the department the employer shall have determinations made of the kind and amount of the atmospheric impurities from a sample taken under conditions and at a point or points indicated by the department. This shall be performed by an analyst qualified for the purpose.
>
> The quantity of any impurities as shown by the determinations shall not be of an amount considered by the department to be injurious to the health of the employees.—

Charlotte E. Carr, Labor and Industry, Pennsylvania Dept. of Labor & Industry, 19, 5:1–3 (May), 1932. E. R. H.

Silicosis—Mr. Tinker asked the Home Secretary the number of workpeople in the coal-mining industry suffering from silicosis during the latest 12 months for which figures were available and the number who received compensation for this disease, giving separate figures for Lancashire. Sir Herbert Samuel replied: "Silicosis is not notifiable and the only figures I can give are those of cases under the Workmen's Compensation Act. The Returns under that Act show that in 1930—which is the last year for which figures are at present available—there were 20 cases in which coal-miners recovered compensation for disablement from silicosis. Information as to the distribution of these cases is not complete, but so far as known, only one of them occurred in Lancashire. I may add that I am informed that the Medical Board, which was set up in June last, has not so far issued any certificate in respect of any coal-miner in Lancashire."—*Lancet*, 5671:1019 (May 7), 1932. E. R. H.

Morbidity and Mortality of South African Miners—The Report of the Sanitation Department of the South African Central Mining-Rand Mines Group for 1931 contains statistical information comparing health conditions during the period with those of earlier years.

The average number of natives employed was 82,416, as against 79,742 in 1930 and 83,340 in 1929.

The percentage morbidity and mortality rates given for the various diseases include the following: pneumonia, 32.61 per cent of total mortality; typhoid fever, 11.06 per cent of total mortality. Accidents accounted for 56.41 per cent of the total morbidity and 23.25 per cent of the total mortality.

The incidence of pneumonia decreased after the cessation of inoculation against the disease. This confirms an exhaustive account of the negative results of inoculation in pneumonia prevention published in the *Journal of the South African Medical Association* in the course of the year.

The tuberculosis rate fell from 5.12 per 1,000 in 1930 to 4.67 per 1,000 in 1931. There were 385 cases with 75 deaths, or a death rate of 0.91 per 1,000.

A comparison of the rates for miners' phthisis in the last 3 years shows a steady decline in the incidence of this disease. The returns for 1931 are as follows: 0.91 cases per 1,000 and 0.05 deaths per 1,000.—

Indust. & Labour Inf., World Peace Foundation, 30 Mt. Vernon Street, Boston, 42, 3:79–80 (Apr. 18), 1932. E. R. H.

The Technic of Experimental Pneumoconiosis—Author's conclusions:

1. A technic is described for the introduction of dust into the lungs of experimental animals by intratracheal injection.

2. The reaction of the lung to dust introduced by this methods is essentially the same as to dust introduced by inhalation.

3. The results obtained indicate that the direct intratracheal injection of dust into the lungs may advantageously replace the dusting chamber for many purposes for which it has hitherto been considered necessary.—

E. H. Kettle and R. Hilton, *Lancet*, 5675:1190–1192 (with plates) (June 4), 1932. E. R. H.

Tuberculosis in South African Natives With Special Reference to the Disease Among the Mine Labourers on the Witwatersrand—This extensive volume is the report of the Tuberculosis Research Committee originally established by the Transvaal Chamber of Mines and later expanded into a Joint Committee by incorporation of representatives of the Union Government.

The chapter headings are: General considerations, anthropological and historical notes on the Bantu Tribes of South Africa; reports on tuberculosis of South African Natives prior to the present inquiry; the principal industries and occupations in which natives are engaged in South Africa; the gold mining industry and health; health services in

the gold mining industry; the tuberculosis of native mine workers on the Rand —with sections on tuberculin tests, tuberculosis in the Native Labour Association's Hospital and in the mine hospitals, incidence and mortality from tuberculosis, pathology and classification of clinical types; tuberculosis survey of the native territories; inferences drawn from the foregoing chapters; and discussion on prophylactic measures now in force or capable of being applied in South Africa.

A summary of the recommendations of the committee is given on pages 297–300. The balance of the volume (pp. 301–429) is devoted to appendixes, carrying tables, charts, and case reports by various authors. The volume is profusely illustrated, including 24 plates, part of which are in colors which depict sections of the lungs and other organs undergoing pathological changes due to silicosis and tuberculosis. The volume is too extensive for further abstracting.—South African Institute for Medical Research, Johannesburg, *Publications, Vol. 5* (Mar.), 1932. 429 pp. E. R. H.

Extensions of the Schedule of Industrial Diseases—This is a report of the Secretary of State by a Departmental Committee on Compensation for Industrial Diseases under Section 43 of the Workmen's Compensation Act, 1925. The matters considered were, poisoning by turpentine, mule spinner's cancer, and dope poisoning.

The committee concluded that no case had been made out for adding poisoning by turpentine to the schedule.

In regard to mule spinner's cancer a definition was agreed upon as follows: "a localized new growth of the skin, papillomatous or keratotic, due to mineral oil," this to be inserted in the first column of the schedule. In regard to the second column, the committee recommended the insertion of the words "cotton spinning by means of self-acting mules." The person undergoing treatment for such localized new growth shall not be entitled for compensation for more than 14 days, unless the judge, committee, or arbitrator, is satisfied, on the advice of the medical referee, that the worker is still incapacitated for work.

In regard to dope poisoning, the committee concluded that it would not be right on the evidence at present available, to add to the present schedule poisoning by any particular substance used as, or in conjunction with, a solvent for nitro-cellulose or poisoning by such solvents generally. It stated that the occurrence of chronic poisoning by any particular substance so used, other than the substances now separately dealt with in the schedule, had not been established; and to include poisoning by all such substances in general terms would be unfair to manufacturers and others, and would go far beyond what would be necessary for the protection of the workmen.—Home Office, Great Britain, London, 1932. 16 pp. E. R. H.

Mule Spinners' Cancer Made Compensable in Great Britain—An order dated April 30, 1932, of the British Secretary of State, provides for the inclusion of new skin growths due to mineral oil in the list of compensable diseases. The order applies to workmen engaged as "minders" of self-acting spinning mules.—*Month. Labor Rev.*, 35, 1: 93 (July), 1932. L. G.

Hospital and Institution Fires—This is a record of 202 hospital and institution fires with a detailed discussion of the major ones which have occurred since 1918 with illustrations and discussions. There is particular space given to fires from X-ray films.—National Fire Protection Association, 60 Batterymarch St., Boston, Mass., Nov., 1931, 66 pp. E. R. H.

FOOD AND NUTRITION

Milk Irradiated by the Carbon Arc Lamp—Fluid milk was irradiated with a flaming carbon arc lamp using a C carbon. Three and one-half million ergs were applied per c.c. of milk for 16 seconds, between 2,000 and 3,000 Angström units. Most of the vitamin D potency is reached in the first few minutes of irradiation.

The investigation was conducted with children similar to the case of the yeast milk experiments of 1931 (*J. A. M. A.* 97:370, Aug. 8, 1931). Over 100 babies between 1½ and 6 months of age were selected from clinics of the Department of Health of New York.

Infants were weighed regularly and frequent roentgenograms of the wrists taken. Through the period from the beginning of January to the end of March, the babies took 24–30 ounces of milk daily, supplemented in the older groups by cereals and vegetables. Many of the infants were negroes, and Puerto Ricans.

Of the 36 babies which had no evidence of rickets in January, all but one failed to show roentgenologic signs of rickets at the end of the trial; the exception was a premature baby which is regarded as a type in which rickets cannot be prevented except possibly by the use of excessive amounts of viosterol. In the larger group with rickets, those of the roentographic type were definitely healed within a month or 6 weeks.

In the so-called clinical rickets where satisfactory results were obtained, the criterions of healing were recession of the beading of the ribs, diminution of craniotabes, or intensification of calcification of the epiphyses. Craniotabes often fail to show recession even with fortified cod liver oil, leading to the belief that in this disorder there is an essential factor aside from lack of vitamin D.

The conclusion is drawn that activated milk is at least as efficacious as the "yeast milk" described in the previous paper. Reference is made to the observations of the varying degree of antirachitic potency between cod liver oil and activated ergosterol. This clinical evidence warrants the conclusion that the activated milk is in the class with "yeast milk" and cod liver oil rather than of viosterol. A quart or less of this milk protects infants from rickets although it contains only 50 units of vitamin D by the standard technic.

The authors discuss the antirachitic agents in 6 classes—(1) irradiated milk, fluid and dry; (2) "yeast milk"; (3) cod liver oil; (4) viosterol; (5) irradiated yeast, and (6) direct ultraviolet irradiation. The antirachitic milk has certain advantages as recent tests have shown that 10,000 to 15,000 times the therapeutic dose could be given young rats without resulting in hypercalcemia. Irradiated milk is inexpensive although probably not available except in urban communities. There is no belief that flash irradiation results in the formation of any harmful products. Milk from cows receiving irradiated yeast is also regarded as valuable. Cod liver oil is valuable and may possess a factor not yet recognized but objection to its use is general on account of the taste and odor.

The most powerful of antirachitics is viosterol which it is believed should be reserved for cases resistant to other methods and applicable in communities where irradiated milk or "yeast milk" is not available.

The question as to whether there is

danger in multiplication of foods fortified by antirachitic vitamin is discussed, as well as the desirability of adults partaking indiscriminately of such foods. The question is also raised as to whether Federal license and supervision should be required before antirachitic foods are permitted on the market.—A. F. Hess and J. M. Lewis, *J. A. M. A.*, 99:647 (Aug. 20), 1932.

The Reaction of the Chicken to Irradiated Ergosterol and Irradiated Yeast as Contrasted with the Natural Vitamin D of Fish Liver Oils—The literature records instances where irradiated ergosterol does not give the same quantitative results for vitamin D as cod liver oil when fed experimental animals.

In these experiments, 2- to 3-day old chicks were used—white Leghorns and Plymouth Rocks—with 15 to 20 birds in each group. The diet was skim milk as a drink with a dry mash of yellow corn containing calcium carbonate and sodium chloride. The ergosterol was incorporated in corn oil. Dry, ground yeast was also fed, having an antirachitic potency of 0.5 Steenbock rat units per mg. The cod liver oil contained 13.3 rat units per gm.—the amount of vitamin D which will produce a narrow line of calcium deposit in the radii and ulnae of rachitic rats in a period of 10 days.

Two of the series with cod liver oil and its equivalent as ergosterol showed that from 40 to 120 times as many units of vitamin D in the ergosterol were required to effect calcification as compared to cod liver oil. The yeast was a poor calcifying source requiring 7.5 to 60 per cent cod liver oil equivalence as yeast to produce the same results. This represents an actual consumption of 0.2 and 1.6 per cent respectively of the weight of the dry mash.

The natural source of vitamin D was also investigated in burbot liver oil, already shown by other workers to contain vitamin D. Thirty-six baby chicks were divided into 3 groups, one on a rachitic ration, another on the same ration plus 1 per cent cod liver oil, and the third with a basal ration plus 1 per cent burbot liver oil. In this series, burbot liver oil was equally efficient per rat units of vitamin D as cod liver oil. In order to determine whether the vitamin D resulting from irradiation was a different substance, irradiated ergosterol was dissolved in cod liver oil to determine whether greater calcification would result than with the cod liver oil alone.

One lot of rachitic birds were given the basal ration plus 2 per cent of cod liver oil having in solution 532,000 rat units of vitamin D as irradiated ergosterol. Another lot was given the same dose of ergosterol in corn oil instead of cod liver oil and a third lot were controls. The irradiated ergosterol represented the equivalent of approximately 40,000 per cent of cod liver oil.

The final weights of the birds on irradiated ergosterol were less than both other controls. There was no change in the ash of the tibiae. The blood serum calcium increased with both solvents and the inorganic phosphorus in the serum reduced.

Another series was run in which the dosage of the irradiated ergosterol was reduced to 100,000 and 250,000 rat units of vitamin D per 100 gm. of the ration. The experiments were conducted for 32 days and similar results were obtained in this series. Loss in body weight compared with initial weights of 250,000 units. No characteristic change in the ash percentage of the tibiae but serum calcium was increased and the serum phosphorus decreased.

Further experiments were undertaken on the curative effect of ergosterol with small amounts of cod liver oil. The ergosterol was equivalent in vitamin D

units to 1 per cent of cod liver oil and was fed with 2 cod liver oil levels—namely, 0.05 and 0.10 per cent, these amounts of cod liver oil having little or practically no effect on calcification.

The irradiated ergosterol in this experiment had absolutely no effect on calcification, while 1 per cent of cod liver oil was very effective. Typical symptoms of toxicity were found with the irradiated ergosterol in excessive doses, manifested by anorexia, loss in body weight, and in the loss of weight in the dry organs. The administration of carotene had no effect on the antirachitic activity of irradiated ergosterol.—H. Steenbock and S. W. F. Kletzien, *J. Biol. Chem.*, 97:249 (July), 1932.

The Effect of Oral Administration of Amino Acids and Intraperitoneal Injection of Various Elements and Hydrochloric Acid on Regeneration of Hemoglobin—The literature contains conflicting statements as to the necessity for supplementing iron with copper in hemoglobin regeneration. Investigators also state that other elements than copper as well as amino acids may have this effect. This experiment was designed to study the effect of amino acids, iron alone, iron supplemented with other elements and, if possible, the amount of copper necessary to supplement iron.

Rats were made anemic with milk from Holstein cows, milked in glass containers. Amino acids were purified and the iron freed completely from copper as shown by spectroscope.

After 1 month on the milk diet, 100 mg. of the different amino acids—tyrosine, tryptophane, glutamic acid, aspartic acid, and arginine—were added plus 0.5 mg. of iron as ferric chloride. No regeneration of hemoglobin resulted with the amino acids. No appreciable difference in effect was noted between 1, 5 and 10 mg. of iron daily.

Animals on a milk diet with added ferric chloride were given intraperitoneal injections of the following elements: nickel, zinc, germanium, manganese, vanadium, arsenic, titanium, selenium, mercury, rubidium, chromium, and 0.005 mg. copper. Arsenic caused an immediate regeneration but after 3 weeks this was lost and no such initial effect appeared in the other elements. None of these, except copper, prevented anemia. The intraperitoneal injection of ferric chloride, if dissolved in glycerol to avoid irritation, caused an increase in hemoglobin.

The authors are in doubt as to whether under these conditions the iron is utilized to the exclusion of copper or whether the difference between oral and intraperitoneal feeding may be due to absorption of iron. When pure ferric hydroxide was injected intraperitoneally to anemic rats, to which were given 0.05 mg. of copper as copper sulphate daily, the hemoglobin response was satisfactory, although there was no regeneration in the anemic rats fed milk without copper.—H. L. Keil and V. E. Nelson, *J. Biol. Chem.*, 97:115 (July), 1932.

Carotene and Xanthophyll as Sources of Vitamin A for the Growing Chick—Xanthophyll and carotene in this experiment were isolated from fresh spinach leaves. The recrystallized xanthophyll had a melting point of 174° and the carotene 172.5°. These were dissolved in cottonseed oil so that 0.5 c.c. of oil contained the daily dose of pigment which was fed to the chicks with a pipette.

Day old white Leghorn chicks in 9 groups were kept in warmers in a semi-darkened room. The basal ration was white corn, wheat middlings, casein, yeast and salt. Six of the group were for a prophylactic experiment and 3 for curative. In the prophylactic group, comparison was made between the basal ration and this ration with 0.5 c.c. cod liver oil added to the ration with 0.03

mg. carotene and with 0.25 mg. xanthophyll.

In the curative test the carotene was 0.05 mg. and the xanthophyll was slightly decreased. Vitamin D was supplied, except in the cod liver oil group, by direct irradiation. Good growth resulted in all groups to the 4th week when the chicks on the basal ration developed vitamin A deficiency followed shortly by death. Good growth resulted on the cod liver oil supplement with 0.03 mg. carotene. Xanthophyll supplement and the one in which cod liver oil was supplanted with cottonseed oil showed no advantage over the basal ration. In the curative technic, xanthophyll resulted in no gains, but with 0.05 mg. carotene the effect on growth and appearance was remarkable.

The feeding of xanthophyll in these experiments did not increase the yellow pigment in the legs and beaks of the chicks. It was also found that after the chicks reached 7 to 8 weeks 0.03 carotene daily is not sufficient as the sole source of vitamin A.—O. L. Kline, M. O. Schultze and E. B. Hart, *J. Biol. Chem.*, 97:83 (July), 1932.

Production of Vitamin A by a Species of Corynebacterium—Although the literature records the production of vitamin B complex by means of bacteria, there is no conclusive evidence of the synthesis of vitamin A by a number of different strains of various organisms. In this work a species of Corynebacterium was grown on a vitamin free medium of dextrose, agar, peptone, and distilled water. Cultures were incubated at room temperature in total darkness.

The rats used were healthy but approached both vitamin A and D deficiency. After definite A deficient symptoms appeared, the rats were divided into lots receiving separately the ration plus 1 drop of cod liver oil per day, one with no supplement, and the third with a supplement of 1 gm. of dried bacteria. The results of this experiment showed a definite growth in the case of rats on the bacteria supplement. To insure absence of vitamins in the ration control supplements were run on the animals with xerophthalmia.

One lot received no further treatment, the second, cod liver oil, the third, the diet in which casein was replaced by peptone and one-half the dextrin by dextrose, and the fourth, the same as the third but with the cod liver oil. The result showed no appreciable amount of vitamin A in the culture medium. Xerophthalmia was cured and slight weight gains recorded.—C. E. Skinner and M. F. Gunderson, *J. Biol. Chem.*, 97:53 (July), 1932.

Idiosyncrasy to Viosterol—Gordon and Lieberman administered irradiated ergosterol in the form of viosterol (100 D and 250 D) in doses of 1 to 9 drops a day to 200 infants, who were observed over a period of from 6 months to 1 year. Untoward symptoms were noted in 15 in the following order of frequency: diarrhea, vomiting, loss of appetite, colic and stationary or loss of weight.

No case was included in this group unless a definite sequence was obtained, consisting of administration of the drug, appearance of ill effects, subsidence of the latter on suspension of the drug and finally reappearance on the resumption of viosterol.

From their study the authors conclude that a definite pharmacologic idiosyncrasy to minute amounts of irradiated ergosterol (viosterol 250 D) exists in some infants. According to the incidence found in their series, this is of more frequent occurrence than the literature indicates. The drug should be suspended on the appearance of any ill effects and permanently discontinued in the event of reappearance of symptoms on its resumption. The idiosyn-

crasy to viosterol may not be permanent. The possibility of an idiosyncrasy should in no way detract from the general use of viosterol in either the prophylactic or the therapeutic treatment of rickets. —*Am. J. M. Sc.*, 183 (June), 1932. Abstr., *J. A. M. A.*, 99:684 (Aug. 20), 1932.

CHILD HYGIENE

ORAL HYGIENE

ORAL hygiene is assuming more and more importance in the child hygiene program. It is increasingly evident that, in order to make any perceptible impression on dental caries in our school population, mouth hygiene must begin prior to school entrance. After the children have entered school, extraction and filling of cavities make up the bulk of the dental work.

The relation of nutrition to oral hygiene has received considerable attention in recent years. There appears to be very little doubt that proper nutrition of the pregnant mother and of the child in its early years conditions, to a large extent, the outcome of the teeth. Undoubtedly certain hereditary factors play a part, but these may be modified considerably by nutrition, freedom from infectious diseases, and other environmental factors.

Reorganization of dental facilities is now under way in a number of places to meet the needs of both the preschool and the school child. The economic as well as the technical problems connected with oral hygiene must receive serious attention. The Odontological Society of Western Pennsylvania is attempting to solve the problem in Pittsburgh with a minimum expenditure on the part of the community.

This society has established fourteen emergency dental clinics in the western part of Pennsylvania, concentrating services on the 6-year molar and deciduous teeth and using only temporary filling materials. In the clinic in Pittsburgh it has taken care of 1,266 patients in 4 months' time, at a cost of less than 9 cents per patient. This has included 1,328 extractions and 1,272 fillings.

How has this been done? Efficient management under the direction of an exceptionally capable secretary has been the keynote of this success. Dr. W. Earle Craig, the secretary, finds time in a busy practice of dentistry to manage the affairs of his society with the same interest and effectiveness he would devote to a private enterprise. His earnest efforts, combined with an ability to obtain coöperation from fellow members, have made his administration a splendid example of good dental society management. He has been ably assisted in this clinic work by a committee consisting of Dr. J. K. Wampler and Dr. Leslie Waddill.

Here are the steps followed in the organization of this clinic. *Oral Hygiene*[1] presents them with the thought that they may be helpful to other societies:

1. A committee of three was appointed to promote and manage the clinic.

2. One hundred and fifty members donate their services. Each operator serves a half day at a time, two being on duty in the morning and two in the afternoon.

3. The local charity organization donates the services of a nurse and attendant.

4. The clinic was furnished in the following manner:

   a. The leading professional building donated three offices.

   b. Local dental supply houses loaned the complete equipment.

   c. The local telephone company installed telephone service at the charity discount rate and the Child Health Council takes care of the bill.

   d. A local printing concern donated admission and record cards.

   e. The building donated the plumbing fixtures and service.

   f. A local towel supply house launders the towels which were donated by members.

   g. Anesthetic gases were donated and

two of the local exodontists care for difficult cases in their own offices.

h. Dentifrice concerns donated tooth paste and the Oral Hygiene Committee of the society provided toothbrushes.

i. Stationery, signs, etc., donated.

j. Dental materials are provided at cost price.

k. Local newspapers were generous in giving publicity and school authorities have coöperated in investigating needy cases and bringing children to the clinic.

A great deal of good has been done by this clinic in the few months it has operated and this without working a hardship on any one person or concern. The society regards the clinic as a temporary emergency effort during present-day conditions.

The needy must be cared for and if organized dentistry does not do it we can look for outside and perhaps unwelcome intervention.

An unusual and radical method of handling the same problem is being carried out in New Zealand. In the current issue of the *Journal of the American Dental Association*[2] it is pointed out that—

The problem of the dental treatment of school children and their instruction in the principles of dental hygiene is being attacked in various ways in different countries. Here, in the Dominion of New Zealand, the government is developing a system which may, at first sight, shock many of the members of our conservative profession by reason of its unorthodox features, but which, on closer investigation, must, I am sure, appeal to all thinking men and women as providing an essentially sound and logical means of solving the problem.

The main feature of the New Zealand service is that the school children are cared for not by dental surgeons but by a corps of specially trained dental nurses. The government established the school dental service soon after the conclusion of the World War. Indeed, it is probable that the decision of the government to do this was influenced by the fact that, during the war, so many men were rejected for service in the army, either temporarily or permanently, on account of dental defects. The constant representations made by the dental profession of the dominion over a period of some 20 years in favor of establishing a school dental service no doubt also helped to influence the government in its decision to develop such a service.

One of the dominion's leading practitioners who had been in charge of the army dental service during the war was selected to organize and direct the new service. The problem that confronted him was no easy one. Consideration of all circumstances led to the decision to create an entirely new type of operator who, as officers of the department of health, would deal only with children in the schools. As was only to be expected many of the members of the profession were startled by so revolutionary a proposal, and at first many objections were raised.

After many frank and full discussions and the consideration of alternative schemes, this proposal was officially approved by the New Zealand Dental Association as the one best calculated to solve the problem. Indeed, the association has taken a very live interest in the development of the service and has on more than one occasion endorsed it. As with all such services, the ultimate aim is to help to raise the standard of general health of the community by eliminating oral sepsis among the children, by ensuring that they have sound teeth with which to masticate and by teaching them the principles of dental hygiene.

A limited number of student dental nurses are appointed by the government every year. The maximum capacity of the training school is 40. The fact that hundreds of applications are received makes it possible to maintain a high standard in the personnel of the service. . . .

Having completed their training and received their certificates, usually at the hands of the minister of health, the dental nurses are sent out to various parts of the dominion to carry on their work among the school children. It should be mentioned here that the problem of providing for the dental treatment of the school children in New Zealand is rendered difficult by the manner in which the population is distributed, about half being concentrated in the metropolitan and urban areas, and the remainder widely distributed throughout the rural districts, since New Zealand is primarily a farming country.

The principle has been adopted of providing regular and systematic treatment over a period of years to a limited number of children, gradually extending to new districts as a larger staff becomes available from the training school in Wellington. It is found that, working on this basis, one dental nurse can successfully undertake the care of a group of about 650 children, clinics being established at suitable centers where children up to this number can be attended to. In organizing the work, schools and school classes are adopted

as the units in preference to age groups. This makes the organization simpler, as it is so much easier to deal with classes as a whole; and, for all practical purposes, the school classes correspond sufficiently closely with the age groups.

No treatment is undertaken without the written consent of the parents, but this is forthcoming in practically all cases. The only children who are eligible for treatment, in the first instance, that is, for the initial cleaning up of the mouth, are the infant children who are in the preparatory classes, as it is considered essential that treatment begin at as early an age as possible. Whenever circumstances permit, children of preschool age are also accepted in limited numbers. The mouths of these children are made clean and healthy by such fillings, extractions and prophylactic treatments as may be necessary. The nurses interest the children in correct diet and in the use of the toothbrush, and leaflets on these subjects are given to them to take home. Parents are invited to attend on the occasion of the first examination, with the object of enlisting their interest and coöperation. Regular reëxamination is one of the main features of the work, and the organization is based on the principle of reëxamination every 6 months of every child for whom treatment has been undertaken. This, of course, limits the number of children that one officer can deal with, but, on the other hand, the system is productive of results which would not be forthcoming if the effort were diffused over larger numbers. The system of reëxamination every 6 months, with, of course, such further treatment as is indicated, is continued as a child passes up through the various grades of a school, until he leaves the fourth standard, which is at the age of 11 or 12. Thus, each child is kept dentally fit for approximately 6 years; after which, parents are urged to see that treatment is continued. Attention is given to dental health education throughout this period. In fact, the treatment itself is regarded as educative.

In carrying out dental treatment on a large scale, a tendency to use the forceps rather freely is sometimes noticeable, and, when dealing with children, this is liable to result in undue sacrifice of deciduous teeth. This tendency is bound to creep in unless the number of patients to each operator is limited. The following figures, based on the statistics of the New Zealand school dental service, show the effect of such limitation of numbers: For every 100 fillings performed, the number of teeth extracted is 37; and of every 100 fillings, 62 are in deciduous teeth.

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PUBLIC HEALTH NURSING*

New York Offers Social Hygiene Course for Public Health Nurses and Social Workers—Even with the existing inadequate reporting of the venereal diseases the figures show that 1 per cent of the population, or 1,227,000 individuals, are at a specified time under care for syphilis and gonorrhea. These figures do not account for any of the large number of unreported, unrecognized, and untreated cases. Interesting studies published by Dr. Nels Nelson of Massachusetts in 1930 show that over a period of 8 years in 42 states, syphilis exceeded scarlet fever by 35,000 cases, diphtheria by 390,000 cases and in 21 states exceeded tuberculosis by 78,000 cases. There is certainly a challenge to health workers in these figures.

Social Hygiene includes the preventive medicine problems of syphilis and gonococcus infections (popularly known as the venereal diseases); sex character education; activities for the protection of youth from moral hazards, especially those tending toward sex delinquency; measures directed against commercialized prostitution; and other activities designed to preserve and protect the social and physical health of the family.—(*Report of the New York State Health Commission.*)

Social Hygiene is a family problem and as such is the concern of every public health nurse. No one can escape the responsibility and all need the accurate knowledge acquired by study and the practical information supplied through discussion of the application of definite principles to specific case problems.

The New York State Department of Health through its divisions of social hygiene and public health nursing is offering a practical course in social hygiene to the public health nurses of the state. Beginning in October, monthly conferences or discussion groups will be held in about 30 cities over the state.

The course will consist of assigned readings for each month requiring about 3 hours, the theoretical solution of actual problems dealing with cases or situations requiring another 3 hours' preparation for the 2-hour monthly conference.

Even in the three lessons on syphilis, congenital syphilis and gonorrhea, the case study method is used rather than the academic method of just learning facts.

The two lessons on sex education will be very interesting, as there are such wide differences of viewpoint on this subject, and these conferences are certain to be very lively.

Courses of study in child hygiene and mental hygiene are being planned for the next two years.

While every effort is being made by public health officials to maintain adequate public health nursing service, staffs are being reduced in many places. It behooves every public health nurse to make herself indispensable to her community and organization if she hopes to retain her job when curtailment is the order of the day. There is no better job insurance than continuous education which gives one a deeper understanding of family and community needs. At no time in the history of nursing has there been a more urgent need for well informed nurses. The problems in almost every home are more serious and more numerous than under usual circumstances, and require a resourcefulness only to be found in well informed workers. Public health nurses need the inspiration derived from study and from the discussion of mutual problems more than ever before, as their daily contacts with depressing situations strain their physical, mental and spiritual resources to the limit.

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V. A. J.

* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, State House Annex, Indianapolis, Ind.

A Famous School to Close—The last class of probationers has been admitted to the New York City Hospital School of Nursing. An order signed by Dr. J. G. William Greeff, Commissioner of the Department of Hospitals, New York City, closes the school to further students.

The reasoning of the Commissioner is clear. More graduates were not needed, for New York has many unemployed graduate nurses. The lack of some of the acute services so necessary to the proper training of students necessitated sending the students to other schools for affiliation for a full half of their 3-year course. Careful study revealed the fact that a graduate staff for the acute wards and an attendant service for the chronic wards would be more economical than the student service burdened with the heavy load of affiliations.

This school, guided by nurses noted for their leadership, has an alumnae association adorned with illustrious names. "A pioneer in its inception, it is equally a pioneer in its manner of closing, for again it is responding to the impetus of a social vision of no mean order."—A Famous School to Close, *Am. J. Nurs.*, XXXII, 8:871 (Aug.), 1932.

V. A. J.

A California County Health Officer Pleads for Public Health Nursing in the Schools—In a letter to the San Luis Obispo City School Board, Dr. Allen F. Gillihan, County Health Officer, pleads so logically and convincingly for public health nurses and health development work in the public schools, that it may be an inspiration to other health workers who are facing a similar situation. It follows in part:

It has just been brought to my attention that you are considering the discontinuance of the health development work in the city schools of San Luis Obispo, and, as your health officer, I am addressing you in order to lay calmly before you the vital importance of such work in modern education.

The work in education of the past few centuries has well proved that a child can neither grasp nor retain instruction unless he is in normal condition; that is, unless his brain is able to function naturally. . . . It would be equally as foolish to use the modern high-pressure expensive methods of education on an undernourished child as it would be to punish him for inattention. Such efforts would be as futile as an attempt to fill a reservoir when the water escaped through leaks almost as quickly as the high-pressure engineering method endeavored to fill it.

By the state school law, school budgets must be based upon the average daily attendance of the previous year. It would seem only reasonable in order to keep attendance up to the mark that very close attention be given to reducing the number of absentees and repeaters as much as possible. Cursory examination into causes of absentees from school, and repeaters in school work, would show that sickness is the most frequent actual cause, as well as a most threadbare excuse; so naturally endeavor should be made to keep sickness down.

Modern higher technical education provides for the training of public health nurses, and the State Department of Education tests the training and ability of each applicant before allowing her to do health and development work in the schools. Although it may at times be difficult to secure a suitable nurse, still there is no lack of competent workers in this field.

Your department must now have available records of the city schools for a number of years. If you will have a tabulation made from these records showing the proportion of absentees each year, your work would quickly show the value of such a nurse in keeping up the average daily attendance on which to calculate the budget for the next year. . . .

The work of public health nurses should at all times be supervised and directed by a person having training, experience, and knowledge of relative values in public health; the results of the nurse's work should be evaluated by the same standards. . . .

The financial depression that is now sweeping the country has resulted in much unemployment. That this will result in undernourishment of your younger school children is but natural. Undernourishment in young school children means poor school work and many repeaters at the end of the school term. This wastage of much money could have been saved by searching out and correcting undernourishment tendencies at its very beginning. In some parts of the United States school nursing service has been discontinued after

having been established for several years, and even at this early date the folly of such action has been demonstrated. In the June *Survey* an article by John K. and Margaret A. Norton on What is Happening in the Schools, says: "In the State of Washington many counties have given up their school nursing service. That this is a dangerous economy was shown by the increased sickness among school children."

The California State school law places the responsibility for the control of communicable diseases in the school directly on the shoulders of the school board.

In the event of an epidemic being introduced into a school, it should be found that the school authorities had neglected to protect themselves under the State Regulation, the responsibility would be theirs.

. . . The efficient and well trained school nurse, by requiring that every absentee from school must pass through her hands before being allowed to return to school, can effectually block such an outbreak. Furthermore, she could find a child with defective vision, secure glasses for him and feel satisfied when she ascertains that his school work promptly improves and the threatened unsatisfactory school work is prevented, and school money is saved from having to be spent on repeating a year's work. Undernourishment could be discovered at its very onset, the cause searched out and corrected. . . . In all sincerity I must say that it is not in a spirit of antagonism that I am warning your board of this unwise and dangerous economy of discontinuing your health and development work, but entirely from an honest desire to help you. . . .

Health of School Child Comes First, *Weekly Bull.*, California State Dept. of Public Health, XI, 26:101–103 (July), 1932. V. A. J.

Canadian Nurse Given Opportunity to Study Abroad—In recognition of the comprehensive program of maternal welfare carried on by the Victorian Order of Nurses for Canada, the Rockefeller Foundation has extended to Elizabeth Smellie, its Chief Superintendent, an invitation to visit a number of European countries within the next few months for the purpose of observing and studying conditions of maternal welfare there.

Miss Smellie was to sail from New York early in September, visiting among other countries, England, Denmark, Austria, Germany, and Italy, returning to Canada about the middle of December. DOROTHY M. PERCEY

EDUCATION AND PUBLICITY*

High School Radio Speaking Contest—Senior high schools in Westchester County, N. Y., participated in an 800-word radio speaking contest as part of the 1932 Early Diagnosis Campaign program of the Health Education Committee, Westchester Tuberculosis and Public Health Association. James A. Tobey, Dr.P.H., Chairman; Ethel M. Hendriksen, Director of Health Education. In Yonkers the same plan was featured by the Yonkers Tuberculosis and Health Association.

Fifteen senior high schools, one-third of the number invited, were represented on the radio program. Nine boys and 6 girls gave 5-minute radio talks in 5 programs on consecutive days over Station WCOH, Yonkers. Three talks were featured with two musical numbers intervening, supplied by high school students, making up half-hour programs.

Two talks judged the most effective were broadcast later over Station WRNY, New York City. The awards

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

consisted of a certificate of merit in two colors, featuring Robert Koch in his laboratory. Each student winning recognition in his own school or appearing over the radio received this certificate especially inscribed and signed. Sample of the certificate will be sent on receipt of 3 cents postage. Westchester Tuberculosis and Public Health Association, 8 Church Street, White Plains, N. Y.

The radio station was so pleased with the feature that the contest will be repeated to aid the Christmas Seal sale.

Adapting Health Education to Human Beings—"Our health education," says Dr. Iago Galdston, speaking on "The Psychophysics of Health Education," is based on the assumption that the individual to whom we address ourselves is passive, is in fact "like an empty vessel, biding time until we come to pour into it what quantity of knowledge and wisdom we see fit." Dr. Galdston's thesis is that health education should be based on a recognition of the dynamic nature of the human being.

If I may be permitted a rather crude analogy to make my point clear, the task of the educator appreciating the dynamic nature of his pupil is as that of a batsman facing a pitched ball, in contrast to, say, a billiard player who seeks to pocket a billiard ball. In the case of the billiard player, he has a bat called a cue; he has a stationary billiard ball and a fixed objective. The billiard player is primarily concerned with the setting of his cue, and with the direction of his thrust, knowing that he can count on the ball to remain stationary until he is ready to shoot, knowing also that the pocket will not shift and that his billiard table is smooth and free of obstacles.

The batsman, however, is part of a dynamic system. The ball he must strike at comes to him with a speed of its own, with a curvature and flight which he must take into consideration. There is an important time element in his performance. He must swing his bat with all factors taken into consideration. Failing of this, he will fan the air, or else make an ineffective if not defeating gesture.

Fortunately, for the batsman as for the educator, the momentum of their respective objects is not capricious and not infinitely variable. Pitched balls, as individuals, fall into a definite and determinable set of categories. And, dropping our analogy, we know that the momentum and progress of the individual's life follow a pattern which is common to the average being.

The quotation is from a paper delivered at the meeting of the National Tuberculosis Association June 7, 1932, and will appear in the association's Transactions as well as in "The Nation's Schools."

Problems in Dramatizing Scientific Material—In anticipation of the clinic on radio plays scheduled for the American Public Health Association convention, October 24–27, 1932, we review here comments received on the series of radio plays about the "Conquest of Disease" broadcast by the Detroit Department of Health and the Detroit Dairy Council. The series was described in this department in the June, 1932, issue.

The questions raised by the critics are of the sort likely to arise in other experiments with the dramatic method of presenting health information and some advance thinking about them may help to point up the discussion at Washington.

The first comment deals with the relation of dramatic interest to health teaching. One critic finds that the themes of these plays center around events and situations that teach no health lesson.

The theme should involve some measure beneficial to the listener and which he can carry out for himself; I mean, getting vaccinated, having a physical examination, or seeing that his children have a tuberculin test, etc.; or it should develop a feeling of friendship and a desire to aid in the advancement of some *existing* institution.

To make my points more specific, consider two of the playlets—take the one on Jenner and the one on Yellow Fever. In the one on Jenner the dominant theme is the unpleasant

conditions of Merry England, while for Walter Reed, it is the ingratitude of Congress and the hard boiledness of newspaper men. In all the talks vital matters pertaining to health improvement are definitely subordinated to dramatic emotional appeal from any angle that presents itself.

Opposed to this criticism is the belief that listener interest is in inverse ratio to the amount of propaganda with which a play is loaded; that building a theme around an obvious moral defeats its own end.

A dramatization of public health which stimulates interest in the subject in general provides an opening wedge for getting persons who would otherwise pay no attention to the subject, to listen later to straight talks.

The next point has to do with scientific accuracy and the dramatic form of presentation. In the series under discussion errors of two kinds were noted. The first are historical, such as several wrong dates, credit for medical discoveries attributed to the wrong persons, and fictitious accounts of events supposed to have occurred in the lives of famous physicians. Has the dramatist the right to distort facts in this way in the interest of his plot? The critic thinks not.

The second set of inaccuracies cited relate to disease and its conquests. The critic says:

The world is not all but free of diphtheria. The bite of a mad dog never was a sure fatality. Persons suffering from hydrophobia do not bark like a dog nor mew like a cat nor do they attempt to bite other persons. A mad animal is not insane. Antitoxin does not contain poison. This apparently is a confusion of toxin-antitoxin with diphtheria antitoxin.

Are errors like these inevitable accompaniments of the process of fitting characters and events into a dramatic form of presentation? If so, is the play an unsuitable method for health education? Or can errors expressed in the conversation of characters in a play be condoned on the ground that radio listeners take in so little detail that these mistakes are not impressed on their minds?

Another interesting point raised:

These radio dramas present scientific discoveries as if they were made in a tense, melodramatic atmosphere with inspiration as their dominant fount.

It is important to sound health education, the writer believes, that the public should realize that medical discoveries are of slow growth. The most casual listener to some of these melodramatic plays gets the impression that one man in one big moment discovered how to prevent or cure a disease.

Are the interests of the dramatist and the scientist then incompatible? This last question, perhaps, puts the whole controversy in a nutshell.

A final criticism relates to the advertising feature of the broadcast:

If the continuity finished with a statement that these dramas were sponsored by the Detroit Dairy Council whose business it was to increase milk consumption, I would have no objection, but in each case the milk is dragged in by the hair of the head and tied up to the stirring drama.

The general impression of the commentator just quoted is quite favorable:

In general, I think they are fine. I do not think they are too melodramatic for the purpose intended. . . . I am not one of those who are so afraid of departing a hair's breadth from fact that they are afraid to say anything with a living spark in it. . . . I think the Radiodramas are good because the final effect must be a stimulation of interest in public health procedure on the part of those who would never otherwise know anything whatever about the subject.

Another comment is favorable:

I feel that a real contribution to health education has been made. . . . For the most part it seems to me that the broadcasts are fairly accurate for radio purposes. While there is something of the melodrama in some of these broadcasts . . . to attract and hold attention it was necessary to make them fairly striking.

Dr. Henry F. Vaughan, Health Department, Detroit, has a few more sets of the Radiodramas which can be sent to health workers upon request.

Mary P. Connolly, Director of Health Education of the Detroit Department of Health, to whom the above discussion was submitted, writes:

We have little defense to make of the material presented and we know that some of the criticisms are warranted, especially those which draw attention to such expressions as an "insane animal." These inaccuracies were corrected in the material before it was presented but unfortunately the original copy was used when it was mimeographed.

Relative to the first comment, I should say that I believe it is assumed that drama should not be used for propaganda. If the purpose of drama is to provide a healthful escape from reality, we, as health educators, will not help the cause of mental hygiene by using the drama for propaganda. As to the time element to which reference is made, drama, as we understand it, should deal with character portrayal and not with events arrayed in chronological order.

We know that dramas are crude in spots; on the other hand, we know that many Detroiters learned from them that science has its heroes and a great part of the public knows only of heroes of battle or of sport.

It is quite true that the man who wrote these dramas took liberties with the material given him for their construction, but it will be difficult to find an historical drama of which the same criticism cannot be made.

Perhaps the most significant result of this presentation was the distribution of more than 200,000 pieces of literature, requests which came from listeners. The literature dealt with the selection of an adequate diet on a reduced income and was distributed at a time when most of us were worried about thousands of families who were facing a second winter on a very curtailed income or were receiving public relief. The science of nutrition came to their aid in selecting food for their families.

M. S. R.

Reader's Friend or Foe—Ralph P. Bridgman, Director of the National Council of Parent Education, was the principal speaker at the session of the National Conference of Social Work at Philadelphia at which "Mental Hygiene Literature: Reader's Friend or Foe" was discussed. Mr. Bridgman criticised a lot of the present-day literature giving advice on the raising of children, and counseled parents to get from their daily experience the understanding and insight needed which cannot be secured from books. He apparently does not think much of most of the mental hygiene books that have come off the presses in recent years. "They are generally written," he said, "in a detached and scientific vein as though parents were another of our national phenomena. Parents are not scientific."

To illustrate his point the speaker quoted from a number of mental hygiene books which are widely distributed. One of these was the statement of George Bernard Shaw that the world needs parents fit for parenthood. Mr. Bridgman further declared that most such books are written by spinsters or unmarried teachers, and he suggested that "perhaps the best mental hygiene literature of the future will be fiction."

Mr. Bridgman's strictures on educational material on mental hygiene were seconded by Dr. Gerald H. J. Pearson, psychiatrist at the Philadelphia Child Guidance Clinic, who said "it is a fetish of the American people that knowledge solves all problems." He said further that "reading books is a kind of soothing syrup taken by those who do not know themselves."

A keynote of the discussion was that we have been rather hard on parents in this matter of teaching them how to bring up their children and that psychiatrists are beginning to change their attitude toward parents. They are beginning to consider them more as human beings, like the rest of us. This point was stressed again and again in Mr. Bridgman's paper, which quoted copiously from many recent books.

Dr. Pearson seemed to disagree with the notion that parents can learn how to train their children by reading books, many of which deal with extreme forms of misconduct in a way that does little if any good to the parents who read them. He compared this with the mis-

take of discussing the later stages of tuberculosis with individuals who are only beginning to show the initial symptoms. Mental hygiene books should not, for example, discuss perversions for the benefit of the average reader. He interpreted the wide popularity of this literature as a phase of civilization, and considered that the prevalence of interest in this literature was due to the desire of people with personal problems to look to such literature for authority as they heretofore looked to the church and tradition.

Mrs. Cecile Pilpel of the American Child Study Association in her discussion of Mr. Bridgman's paper spoke of two types of mental hygiene literature: (1) that addressed to the general reader interested in personality development, and (2) books on parent-child relationships read by church, school, and study groups. She declared that such literature should not be concerned solely with emotional aspects of mental hygiene, and expressed the confidence that a better and more rational, good sense type of literature will emerge in the future.

Miss Christine Robb of the Institute for Child Guidance, New York City, also criticised some of the current mental hygiene literature, illustrating one of her points by referring to the extreme case of a parent who had followed John Watson's books literally, to her detriment and that of her children. She deplored the fact that pseudo-scientists were writing mental hygiene books today because our clinicians and mental hygiene educators were not. She thought that mental hygiene literature was peculiarly dependent upon its manner of presentation for its good or bad results.

Dr. Benjamin C. Gruenberg said that mental hygiene is now in the stage of the discoveries of physical pathology, although we are beginning to emerge from this stage and are thinking in terms of mental hygiene as a way of life. He spoke of a transition from the negative to the positive side of mental hygiene education. He did not think much of books on how to behave, and spoke of the need of holding from time to time a clinic on mental hygiene books, referring to the present meeting as a good beginning.—Paul O. Komora.

"Lobby" Sessions—The Washington program is rich and varied—for the health educator and for health workers in all fields. Equally important will be the "lobby" sessions—the exchange of ideas and experiences with individuals and small groups. "What is on your mind?" "What question do you want answered?" Ask these questions—and give your own as well and the conference will start.

And bring your questions to Education and Publicity Headquarters. We want to know what they are.

Ask for Education About Milk—Said the report of the Committee on Milk of the Conference of State and Provincial Health Authorities (June 2, 1932):

> The local health officers of committees in which any considerable percentage of the market milk is still sold raw are urged to use an educational approach. . . .
>
> Furthermore, the dairy industry, through the agency of such an organization as the National Dairy Council, could with advantage inaugurate a persistent radio program which would combine a campaign for adequate milk consumption with one for the encouragement of the use of pasteurized milk only. If the National Dairy Council or other dairy organization undertakes such a radio program, the U. S. Public Health Service and the various state and city health departments should assist in furnishing the necessary educational material.

The report also outlined educational work with the milk producer, allotting parts of the effort to the health and agricultural departments. In *Public Health Reports*, Washington. Aug. 12, 1932.

BOOKS AND REPORTS

Towards National Health, or Health and Hygiene in England from Roman to Victorian Times—*By J. Anthony Delmege, O.B.E., With a Foreword by Sir Thomas Legge, C.B.E. New York: Macmillan,* 1932. 234 pp. Price, $6.50.

Two unusual books on the history of medicine have appeared during the past year, *Man and Medicine*, by Sigerist, reviewed in our issue of July, and the one whose title heads this review. Unlike as they are in many ways, both go back to fundamentals.

Delmege points out in his preface that the ground he covers has been strangely neglected and he knows of no work which considers it, which seems to be true. He has covered the history of medicine thoroughly though briefly from something like 10,000 B.C. to 1875, when the great Public Health Act was passed. Except for the ancient historical features the history is largely of medicine in England.

Vaughan, in his autobiography, makes the statement that if history were more carefully read there would not be so many alleged discoveries announced. It is interesting, therefore, to find descriptions and see illustrations of terra cotta pipes from the Island of Crete dating 3000 to 1800 B.C. These pipes are said to have been beautifully made and finished, fitted with cemented joints and laid on concrete beds.

The Egyptians naturally had evolved a high degree of hygiene, though they were helpless in face of epidemics. Moses had the Egyptian type of education and his ideas were unquestionably founded upon that. The Mosaic laws gave us the first definite legal codes which were enforced upon an entire nation. From this time on the author traces in various nations the development of hygiene in the earliest civilizations, describes the sewage disposal of Rome, and the bath houses and baths in Roman countries.

An unpleasant note, though true, shows that the physicians in the great plagues of the 17th century did not live up to the standards which have always marked the medical profession. They fled with the rich to the country and left the poor people to suffer; but here and there stand out those wonderful figures of whom the world must always be proud, such as the vicar of Eyam who stayed by his parish until the plague exhausted itself after 13 months and left only himself and 29 others out of an original 350 inhabitants.

The great reformers, like Howard, Sedgwick, Simon and Southwood Smith, and the great physicians Jenner and Sydenham with many others are mentioned in interesting sketches. Again the truth of what Vaughan said is demonstrated when we read what Howard said about the plague—that cleanliness, fresh air, adequate diet, and separation would save many more lives than the parade of medicines in the apothecary's shop.

The story of the gin drinking craze which lasted for 25 years is also described. One can hardly help wishing that the author had been a little more full in his stories, but it must be said that practically nothing of value has been omitted. We have a most interestingly written story covering a vast length of time.

The book is well illustrated with excellent portraits obtained from authentic sources. The printing and make-up are exceptionally good, though the number of illustrations and their size have compelled the use of a paper which is heavy and glazed. MAZŸCK P. RAVENEL

Health and Home Nursing—*By George Margaretta Douglas. New York: Putnam,* 1932. 383 pp. Price, $2.50.

In all nursing schools nurses sooner or later study the history of nursing because—

> The origin of our various activities, the spirit animating the founder of a profession, and the long struggle toward an ideal as revealed by a search into the past—these vivify and ennoble the most prosaic labors, clarify their relation to all else that humanity is doing, and give to workers an unfailing inspiration in the consciousness of being one part of a great whole.

It is logical and fitting then that high school and college girls studying home nursing as they are doing more and more every year should have this insight into the past also, and perhaps they need it more as they are not apt to have Dock and Stewart's revised *A Short History of Nursing* readily available.

Miss Douglas devotes four chapters of her book to the concern for health among prehistoric people, and those in the ancient and medieval worlds, leading up to health and nursing in the world today. Then she has a fine chapter on the care of the baby and preschool child—laying the foundations of health in the years when most can be done, when there is a chance to prevent a great deal of illness.

The rest of the book is devoted to topics usually treated in books of this kind, such as symptoms of illness, making a comfortable bed, and the like. She gives a little more of the philosophy of home care and gets in a little more of the inspirational side of nursing than usual. The last chapter, which deals with occupational therapy and its effect on mental hygiene, is new.

The Questions and Activities at the end of each chapter are original and thought provoking. There is a full and carefully chosen list of References and Suggested Readings, also, after each chapter, and a complete Bibliography, an appendix and a good index at the end of the book.

There are a few typographical errors, but the book is attractively printed, well illustrated and simply written—it makes very interesting reading. It is scientifically sound, practical, and up-to-date. It is recommended highly.

EVA F. MACDOUGALL

Medical Men in the American Revolution 1775-1783. *The Army Medical Bulletin No. 25—By Louis C. Duncan, Lieut. Colonel, U. S. Army, Retired. Medical Field Service School, Carlisle Barracks, Pennsylvania,* 1931. 414 pp.

In this bulletin Colonel Duncan analyzes and discusses the available official and unofficial data dealing with the medical men and the medical activities of the American Army during the American Revolution. The story is especially well told, interesting, and readable. The author has drawn delightful pen pictures of such noted men as Church, Morgan, Shippen, Rush, and many others. He discusses dispassionately their successes and failures against a background of ever changing political and military conditions.

It appears that typhus was the most prevalent disease among the American troops, and that the intestinal diseases and smallpox also exacted a terrible toll in lives and health. The attempts to control smallpox by inoculation are graphically described. The author estimates from his data that 70,000 men died of disease during the entire period of the war, or an average of 10,000 a year. He also estimates that 10,000 died as the result of battle injuries.

Medical Men in the American Revolution is published as a Government bulletin. The text is divided into 25 chapters and 2 appendixes. Explanatory notes and a biography are placed at

the end of each chapter. It is a welcome and very much worthwhile addition to the literature on the history of medicine.

GEORGE C. DUNHAM

Accidents, Neuroses and Compensation—*By Dr. James H. Huddleson. Foreword by Dr. J. Ramsay Hunt. Baltimore: Williams & Wilkins,* 1932. 256 pp. Price, $4.00.

Because of the advent of Workmen's Compensation Laws and the World War, traumatic neuroses have assumed increasing importance, especially as related to industrial accident work.

This excellent scientific treatise includes a consideration of historical points; etiology; classification and symptomatology; structural pathology; post-traumatic psychoses, psychopathies, and malingering; specificity between situation and syndrome; evolution, duration, and prognosis; differential diagnosis; treatment; compensation; and prophylaxis.

There is an excellent bibliography of approximately 500 international references. A useful feature of the book is a summary at the end of each chapter. Case histories are wisely used to illustrate various principles.

The author has some very definite ideas concerning compensation:

> In brief, if the awarding of money for traumatic neuroses cannot be legally and finally abolished, then it should be given in a single sum at the earliest possible moment, in an amount ranging from $50 to $500. Actual verdicts in personal injury suits are too tardy in time and too liberal in amount. The postponement of a final cash award destroys its curative properties. Continuous payments possess questionable socio-economic merit and generally less than no therapeutic value.

Regarding prophylaxis, Dr. Huddleson states:

> If, as Wechsler says, "a neurosis is the penalty one may pay for growing up," then traumatic neuroses are among the penalties incurred by society through hyperindustrialization and depersonalization. Without being obliged to alter main trends, civilization is bound to apply correctives. . . . Quick resumption of occupation is strongly prophylactic in the face of sudden fright and little injury. Patients with cerebral injuries must be kept in bed long enough to preclude postconcussion neuroses.

This technical and highly specialized work deserves a place in the library of every industrial physician, where it will eventually prove its usefulness as an important reference volume.

C. O. SAPPINGTON

Vitamins: A Survey of Present Knowledge. *Medical Research Council Special Report Series, No. 167. London: Published by H. M. Stationery Office,* 1932. Price, 6s. 6d. net.

In 1931 we had a very complete and excellent review of "The Vitamins" from the Pickett-Thompson Research Laboratory, also the second edition of "The Vitamins," by Sherman and Smith. Now comes the present volume, which is complete and thorough. While the book is vouched for by the Medical Research Council, there is a special Committee upon Accessory Food Factors. The auspices under which this extensive report is issued places it practically beyond criticism.

The book opens with an historical introduction of 14 pages, one of which is given up to charts. We believe this to be the most exact history we have examined, and much needed in view of the claims which have been made by certain persons. Each of the vitamins is then taken up in turn, and an especial chapter is given to "Vitamins and Dental Tissues," which takes in the work done by May Mellanby.

Useful as the story of the vitamins is of itself, for the general reader, the last third, approximately, of the book will be more interesting and of more practical use to the average physician, considering as it does, "Some Nutritional As-

pects of Cow's Milk with Special Reference to Vitamins," "Vitamins and Human Diets," to which 42 pages are given, and "Vitamins in Diet of Mother and Infant." These really treat of the application of our knowledge of the vitamins as given in the first two-thirds of the volume.

The illustrations are abundant and excellent, as are also the tables. Under each vitamin, foodstuffs are listed giving the relative amount of that particular vitamin in them, together with the references from which they are taken. At the end there are 25 pages of references.

Appendix I, Table XXI, gives a list of foodstuffs, requiring 9 pages, with the relative amount which each contains of all of the vitamins, A, D, E, B_1, B_2, B, and C. Appendix II gives the report of the Conference on Vitamin Standards, held in London in 1931. There is a good index.

With this book alone, there is no reason for anyone to lack knowledge concerning the accessory food factors. It shows the careful preparation and exactness which has been so characteristic of the publications of the Medical Research Council of England.

MAZŸCK P. RAVENEL

Manual of Public Health Nursing—*Prepared by The National Organization for Public Health Nursing. New York: Macmillan* (2d ed.), 1932. 253 pp. Price, $1.50.

Every public health nurse whether working alone or on a staff should find this *Manual* a safe guide and ready reference. It contains procedures and technics scientifically worked out, and it holds the cream of all the policies, procedures and technic the world over.

The standards set up by N.O.P.H.N. in this book are wide in scope and general in character leaving room for each individual organization to modify them to meet its needs. The material is rightly divided into two parts, "Organization and Administration," and "Nursing Procedures and Techniques," making it clear in its meaning and easy to refer to.

RUBY ROGERS

Human Sterilization. The History of the Sexual Sterilization Movement—*By J. H. Landman. New York: Macmillan,* 1932. 341 pp. Price, $4.00.

Chapter I is concerned with the general eugenics movement and the systems which may be used to restrict the multiplication of socially undesirable individuals. The author believes that since segregation of catogenic individuals has failed to eliminate them from the race, the more effective method of human sterilization of the socially inadequate individuals should be practised.

By means of statistical evidence given in Chapter II, the author acquaints one with the extent and cost of the mentally diseased and incompetent individuals in the United States. The succeeding chapters deal with the problem of human sterilization, including a history of human sterilization in the United States; the legal status of human sterilization laws; types of mentally diseased and mentally deficient people; and the classification of the inheritance of psychotic traits and of mental deficiency. The various types of human sterilization operations are listed, including the relatively new biological method. Possible physiological and mental effects of sterilization are discussed. The legal status of human sterilization operations is treated concisely. In Appendices A to J, statistical data in regard to sterilization statutes, motives for sterilization operations, records, and fees are given.

The author directs attention to the fact that cases of dementia praecox and manic-depressive insanity are most frequent in institutions, and that very few recover. For this reason he considers

it important that therapy and legislation should be concerned first with these cases.

The work can be recommended for its fund of information concerning a controversial question. It is well documented, and must serve a useful purpose.

NEWELL R. ZIEGLER

Official Proceedings of the 37th Annual Convention of the American Society of Municipal Engineering, Held at Pittsburgh, Pennsylvania, October, 1931—*St. Louis: American Society of Municipal Engineers*, 1932. 855 pp. Price, $7.50.

This volume presents in 27 chapters the matters dealt with by municipal engineers, city officials, and others at the 37th Annual Convention in Pittsburgh. Certain chapter headings indicate the types of municipal problems receiving discussion in this 5-day meeting—city planning, air ports, traffic control, municipal financing, paving construction, and maintenance. Of particular interest to sanitary engineers and sanitarians are chapters V, VI, and VII, dealing with water works, refuse disposal, and sewerage and sanitation.

In a paper on taste and odor removal, Baylis calls attention to various methods in use. Among other things he says "So far as is known there is practically no taste producing compound likely to be present in water that cannot be removed by activated carbon." The powdered forms seem to be most satisfactory. D. E. Davis describes several modern zeolite plants in his paper on zeolite in water softening. Detailed cost data are given, particularly on the plant at Sewickley, Pa. In a discussion of lime-soda water softening, Porter deplores the lack of attention to this important problem. He points out that less than 10 per cent of the water supplies in the United States needing hardness removal are softened.

Chapter VI covers refuse disposal and reviews prevailing tendencies in incineration. Sewerage and sanitation are dealt with in Chapter VII. Specific subjects discussed include sewer maintenance, mechanical handling of sludge, sewage and trade wastes treatment, and lime-chlorine treatment.

E. S. TISDALE

Diseases of the Coronary Arteries (Myocarditis)—*By Don C. Sutton, M.D., and Harold Lueth, M.D. (Illus.) St. Louis: Mosby*, 1932. 164 pp. Price, $5.00.

The authors, with a wide knowledge of the literature and a clear insight into the broad and extensive theoretical aspects of the subject, have made this work one that should be of practical application to the specialist in cardiology, but most particularly to the man in the general practice of medicine.

The book has three outstanding features—the practical nature of the subject matter presented; the clearness of expression, and particularly the distinctive and lucid description of clinical signs and symptoms; and the emphasis that is placed upon the physical signs and symptoms. By students in cardiology and those in the practice of medicine, the work should receive recognition and wide acceptance.

In recent years much emphasis has been placed upon electrocardiography by those writing upon the subject of the various phases of heart disease. The electrocardiograph is an expensive apparatus and one that is available to only a small percentage of those practising medicine. The authors properly give recognition to this refinement as an aid to diagnosis and prognosis. They also and properly emphasize that even with the electrocardiographic interpretation, reliance for the diagnosis under given conditions must often be placed unhesitatingly upon the clinical diagnosis; that is, physical signs and symptoms. They repeatedly call attention to the dangers

of relying entirely upon an electrocardiographic curve in the diagnosis of either coronary or myocardial disease.

There is one criticism to be offered. In recording the leucocyte count, the authors fail to give the findings that are of the utmost importance—the differential percentages, and an evaluation of the young, or immature forms of the polymorphonuclear neutrophils. The total white cell count, which is the only leucocyte count recorded, is only an index of resistance on the part of the patient to an infection. It is not an index to the presence of an infection. The differential leucocyte count, which is the most reliable guide to the presence of an acute pyogenic infection, should always be recorded wherever the leucocyte picture is under consideration, and with this there should be an evaluation as to the young or immature forms of the polymorphonuclear neutrophils.

M. PINSON NEAL

Cancer. What Everybody Should Know About It—*By James A. Tobey, D.P.H. Introduction by Joseph Colt Bloodgood, M.D., and H. L. Mencken. New York: Knopf,* 1932. 313 pp. Price, $3.00.

There has long been a need for a popular work on cancer, one in which the style is simple and the subject presented in a manner not too repellent.

For many years the only volume which in any sense met this need was the volume written by an Englishman, Charles P. Childe, entitled "The Control of a Scourge, or How Cancer is Curable." But this book is now out of date in many of its aspects, though it is still valuable because of its breadth of vision and the admirable style in which it is written. It is practically unknown in this country except among those interested in the educational phases of the cancer question.

For us especially a work is needed from the American viewpoint, particularly one giving full information about methods of control employed in America. This the author has accomplished in an exceedingly satisfactory manner, and has used his material well. The interesting records of the past have been introduced, and form an introduction to the whole subject of cancer.

The writer then turns to the occurrence of cancer in famous people, that is, famous people in whom cancer was acknowledged as a cause of death. There are many not on his lists whose death certificates or obituary notices mask under the diagnosis of heart failure or pneumonia the fact that their end was really due to cancer. True, this phase of falsification of death certificates is passing, but there are numerous examples of it still known to every consultant.

The types, locations, diagnosis, and treatment of cancer are then taken up. Obviously, as the writer is not a physician, the medical side is not presented in a highly technical fashion, but sufficient is said to enable people with the more common varieties of cancer to realize their situation and consult a physician, provided they desire to do so. There still remains a strange hesitancy on the part of intelligent individuals to take this step which places upon them the responsibility of accepting an operation or radiation treatment, so long as they can conceal, by some process of mental inhibition, the exact nature of their disease from themselves and from their families, and there are still many who turn up at last in desperate condition, asking for help when no help can be given. Education does little for such people.

On the other hand, there are those whose lives are rendered burdensome by the fear, and usually an unnecessary fear, of the disease. This development of a cancer phobia has resulted in some criticism of the organizations whose object it is to provide public education.

In many instances this criticism is loudest from members of the medical profession, who directly benefit in so far as their ability to cure cancer cases is dependent upon the education which these agencies offer. The members of the medical profession, however, are still too set upon cure, and not upon prevention. They do not realize that these neurotics, if they did not have a cancer phobia, would have some other kind of phobia, and would still throng their offices and ask for a diagnosis. A little kindly interest in such people and a careful physical examination will remove their fears. If the neurosis recurs, another examination will give them a period of mental rest—all this with the very slightest expenditure of time and energy on the part of the physician. It is strange that such a situation exists in these days.

The chapter on treatment leads obviously to the subject of radium and X-rays, and one of the best chapters is that in which the work of Roentgen and of the Curies and their remarkable discoveries are outlined. An excellent warning is given as to the necessity for long and painstaking research which will surely be necessary before an effective general cure may be discovered, and the conditions under which any suggested cure must be studied. Some of the loudly advertised "cures" are treated in detail.

The question of the increase in cancer is intelligently discussed, and a sane position taken on that phase of the cancer question, concerning which it is easy to become emotional.

A most original portion of the book is that discussing quack cures. It should be read by everyone, for every physician knows how prone people are, when they hear that a friend or a relative has cancer, to recommend some extraordinary quack, and place the family physician in an embarrassing situation. If he is unable to cure the patient, why should not the patient go somewhere, they ask, and take something, often at a high price, which may possibly do some good? The fact that it never has and never will do any good seems to be no deterrent to the lay mind. This problem leads to the discussion of cults, of the method of selecting a good physician, as contrasted with the quack, and finally an excellent review of the rise of the educational movement in cancer in this country and in Europe.

In the last chapter there is a summary in the form of a group of cancer maxims which compresses in a few sentences the essential facts a layman should keep in mind.

The volume is illustrated with an excellent series of charts, many of them drawn from the publications of the American Society for the Control of Cancer, and a useful bibliography is appended for those who wish to read further on the subject. Altogether the volume is well written, excellently printed, and admirably covers the ground which the author intended it to do.

FRANCIS CARTER WOOD

Report on Chronic Disease in New Jersey—*Department of Institutions and Agencies, Trenton, New Jersey*, May, 1932.

The problem of chronic disease is an especially difficult one. We have before us a report made in accordance with a joint resolution of the New Jersey Legislature in 1931, which gives every evidence of expert study as well as compilation.

It shows that 1 person in every 650 residents—a total of 6,000 to 7,500 chronically ill patients—is under the care of various agencies. There were 14,000 deaths from cancer in 1931. In 1880, only 2.2 per cent of the deaths were due to cancer, but there has been a steady rise to 10 per cent in 1930. Practically the same thing is true of

heart disease, to which 12.2 per cent of all deaths were due in 1920, while in 1930, the percentage had risen to 21.7.

Another point of great interest to all health workers is the shift in the age of those chronically ill, which seems undoubtedly due to public health work, which saves the younger. In 1880, 18.5 per cent of the population in New Jersey were 45 years or over, while 21.1 per cent of the deaths occurred in those 60 or over. In 1930, the percentage for the first group was 23.1, while the death rate in the latter group had risen to 44.1, and the deaths of children under 5, which made up 39.1 per cent of the total in 1880, had fallen to 12.1 per cent in 1930.

This excellent report considers also the facilities for treating and housing chronic cases, and excellent programs are suggested.

Crippled children come in for due consideration, both as regards causation and subsequent care. Infantile paralysis, as would be expected, stands first as the cause of crippling, with tuberculosis second.

This report can be commended to all health workers as well as to those interested in health conditions.

MAZŸCK P. RAVENEL

BOOKS RECEIVED

MENTAL DEFICIENCY DUE TO BIRTH INJURIES. By Edgar A. Doll, Winthrop M. Phelps and Ruth Taylor Melcher. New York: Macmillan, 1932. 289 pp. Price, $4.50.

THE SPUTUM. ITS EXAMINATION AND CLINICAL SIGNIFICANCE. By Randall Clifford. New York: Macmillan, 1932. 167 pp. Price, $4.00.

NURSES ON HORSEBACK. By Ernest Poole. New York: Macmillan, 1932. 168 pp. Price, $1.50.

NEGRO HOUSING. The President's Conference on Home Building and Home Ownership. Washington, D. C. 1932. 282 pp. Price, $1.15.

PRINCIPLES OF CHEMISTRY. 3d ed. By Joseph H. Roe. St. Louis, Mosby, 1932. 486 pp. Price, $2.50.

EMERGENCY WORK RELIEF. By Joanna C. Colcord, William C. Koplovitz and Russell H. Kurtz. New York: Russell Sage Foundation, 1932. 286 pp. Price, $1.50.

PRINCIPLES OF MENTAL DEVELOPMENT. By Raymond Holt Wheeler and F. Theodore Perkins. New York: Crowell, 1932. 529 pp. Price, $3.75.

PREVENTIVE MEDICINE. 4th ed. By Mark F. Boyd. Philadelphia: Saunders, 1932. 532 pp. Price, $4.50.

BACTERIOLOGY AND PATHOLOGY FOR NURSES. 6th ed. By Jay G. Roberts. Philadelphia: Saunders, 1932. 259 pp. Price, $2.00.

YOUR TEETH. THEIR CARE AND PRESERVATION. By Lewis H. Urling. Philadelphia: Dorrance, 1932. 67 pp. Price, $1.50.

LABOR PROBLEMS AND LABOR LEGISLATION. By John B. Andrews. New York: American Association for Labor Legislation, 1932. 135 pp.

ENVIRONMENTAL FACTORS IN NEGRO ELEMENTARY EDUCATION. By Clark Foremen. Chicago: Julius Rosenwald Fund, 1932. 88 pp.

PRACTICAL MEDICINE YEAR BOOKS—GENERAL MEDICINE, PEDIATRICS AND GENERAL THERAPEUTICS. Chicago: The Year Book Publishers, 1931 and 1932. General Medicine, 800 pp. Price, $3.00. Pediatrics, 550 pp. Price, $2.25. General Therapeutics, 450 pp. Price, $2.25.

STUDENT'S HANDBOOK ON NURSING CASE STUDIES. 2d ed. Deborah MacLurg Jensen. New York: Macmillan, 1932. 129 pp. Price, $1.25.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Milk Production Standards—Committee (State and Provincial Health Authorities) recommendations in reference to the misuse of the term "natural" for raw milk; short-time pasteurization; recombined milk; and other problems of dairy and creamery supervision are published.

ANON. Report of Committee on Milk. Pub. Health Rep. 47, 33:1683 (Aug. 12), 1932.

Preventing Postvaccinal Encephalitis—Encephalitis, which occasionally follows vaccination, may be prevented by employing a suitable technic, performing vaccinations in infancy, and preferably after immunization with toxoid. This is a highly important paper.

ARMSTRONG, C. Postvaccination Encephalitis. Pub. Health Rep. 47, 30:1553 (July 22), 1932.

European Public Health—As public authorities in Europe lay increasing stress on adequate treatment as a basis for public health, the private practitioner of medicine more and more is drawn into close relation with the government. Where the coöperation is best, the material position of the physician has not suffered.

BOUDREAU, F. G. Relation of Private Medical Practice to Public Health in Europe. J. A. M. A. 99, 9:720 (Aug. 27), 1932.

British Prenatal Hygiene Practice—Some of the reasons why antenatal care sometimes fails to prevent mortality are set forth in candid detail. The final conclusion is that much that passes for prenatal care is too irregular, too infrequent, too ill organized and perfunctory to deserve the name, and can never do anything but bring preventive midwifery to ill deserved disrepute. When the English call a spade a spade, they do it with vengeance.

BROWNE, F. J. Antenatal Care and Maternal Mortality. Lancet 223, 5679:1 (July 2), 1932.

Child Labor vs. Child Health—The possibilities in our present economic and industrial conditions for the increase in the employment of children to the detriment of future public health is discussed, as is the need for preventive measures.

DINWIDDIE, C. Child Labor: The Enemy of Child Health. Pub. Health Nurs. 24, 9:461 (Sept.), 1932.

Variable Streptococci—Presenting evidence that a streptococcus, a rod-shaped spore producer, and a filterable form are different phases in the life history of the same organism recovered from cases of epidemic encephalitis.

EVANS, A. C. The Metamorphosis of Streptococci into Spore-Bearing Rods and into Filterable Forms. Pub. Health Rep. 47, 34:1723 (Aug. 19), 1932.

Maternal Mortality—A questionnaire study of maternal deaths in New York State is reported upon. Less than half the deaths were associated with live births; abortion was a factor in a fifth of all deaths; a third of the patients had previous illnesses which may have affected the outcome. These are some of the findings.

GARDINER, E. M. Maternal Mortality—Outline of Method of Study. Child Health Bull. 8, 5:146 (Sept.), 1932.

Irradiated Milk—Despite its failure to measure up in antirachitic units according to the standard rat tests, irradiated milk was found in practice to be highly potent in preventing rickets. This naturally leads to a question of the reliability of accepted tests.

HESS, A. F., and LEWIS, J. M. Milk Irradiated by the Carbon Arc Lamp. J. A. M. A. 99, 8:647 (Aug. 20), 1932.

State and Local Health Units—"A state department of health should be prepared to assist county health departments through financial assistance, establishment of standards for personnel, administrative guidance and technical service." This is the first of several eminently reasonable conclusions ending this worthwhile contribution to administrative practice.

MUSTARD, H. S., and SHARP, W. K., JR. Service of State to Local Health Departments. Pub. Health Rep. 47, 31:1601 (July 29), 1932.

Pasteurization in England—In this discussion advocating general pasteurization, the statement is made that, although England lags behind other countries in this matter, in London more than 90 per cent of the milk is pasteurized.

ORR, T. Is Pasteurization the Solution of the Milk Problem? Pub. Health 45, 11:326 (Aug.), 1932.

High School Health Education—In Lynn (Mass.) a highly successful health education program was formulated and carried out. This paper has the merit of telling, not what should be done, but what was done and how.

STEPHENS, E. The Three-Year Health Education Study in the Lynn English High School. New Eng. J. Med. 207, 6:263 (Aug. 11), 1932.

Training Health Educators—The training in the basic sciences, hygiene and pedagogy that should be required of the school health educator is set forth in convincing detail.

TURNER, C. E. Training for Health Education. Pub. Health Nurs. 24, 9:486 (Sept.), 1932.

American Public Health—This brilliant summary of the newer movements in health administration designed for British ears will prove just as worthwhile for home consumption.

WINSLOW, C.-E. A. Current Tendencies in American Public Health. J. Roy. San. Inst. 53, 2:62 (Aug.), 1932.

NEWS FROM THE FIELD

It will be appreciated if readers will send to this department such items of news interest concerning public health activities as they consider suitable.

100 YEARS AGO

AN ordinance creating a board of health in Trenton, N. J., dated July 3, 1832, was recently found by the city clerk. This was 55 years before local boards of health were required by law in New Jersey. The board appears not to have been appointed for a definite length of time, but one could be appointed in case of need and it could dissolve itself when its work was done. The board was authorized to procure and circulate advice concerning the danger of infectious and contagious diseases and in time of epidemic to "take such measures as they may deem best calculated to arrest its progress and render its ravages less destructive," and it was its duty to "make daily reports of progress of the disease and the measures which they have adopted."

ATHENS USES ANCIENT AQUEDUCT

WHEN Greeks and Romans builded, it was for permanency. The new water works for the City of Athens, constructed under the direction of an American, Richard M. Merriman, of Bethlehem, Pa., includes in its system the ancient Hadrian Aqueduct, a fifteen mile tunnel through the Plains of Attica.

This aqueduct, apparently, was originally constructed during the second

century A.D. It was used for 1200 years, but was then abandoned for some unknown reason. It has now been cleaned and renovated, and through it flows water for the citizens of Athens who for centuries have scrimped along on one and one-half gallons of water a day for all purposes.

The water works themselves, as explained in an article by Oren Arnold in the *Water Works Journal* for April, 1932, occupy the site of the historic Battle of Marathon. Marathon Dam was constructed in 5 years at a cost of $12,500,000. This, however, was 19 miles from Athens. The Parnes Divide was crossed by an 8-mile tunnel and the Hadrian Aqueduct utilized for the remainder of the distance.

It was necessary to combat malaria constantly during the construction period. Living quarters were doubly screened, stagnant water drained and oiled, and minnows from Italy put into the new lake.—*Health News*, New York State, Aug. 15, 1932.

ROAD DUST PREVENTION

AMONG recent developments in chemical science, designed to promote public comfort, health, and safety, is the discovery of a better method for the prevention of dust on gravel highways. Every year road dust exacts a large toll in the form of accidents, due to dust clouds at curves, intersections, and other dangerous points.

To correct these conditions, many communities are using a comparatively new method of treatment, known as the calcium chloride treatment. Calcium chloride is supplied for road dust prevention in the form of small white flakes, which when spread over the surface of the road begin immediately to absorb moisture from the air, continuing the process until the surface appears to have had a light rain. Unlike rain, however, this moisure remains for weeks and in some cases months, binding the loose dust into a moist, smooth, durable surface.—*Public Safety*, 6, 9:14 (Sept.), 1932.

PERSONALS

BERNARD C. ROLOFF, formerly Director of Health Education of the Chicago Department of Health, is the new Executive Secretary of the American Mouth Health Association, of Minneapolis.

MAJOR EDGAR ERSKINE HUME, M.D., DR.P.H., F.A.P.H.A., has been appointed Librarian of the Army Medical Library—Surgeon General's Library — of Washington, D. C. This institution, the largest medical library in the world, was founded by Surgeon John S. Billings, who also planned the Johns Hopkins Hospital Library and the New York Public Library, and was President of the American Public Health Association in 1879–1880.

HARRY S. MUSTARD, M.D., F.A.P.H.A., of the Tennessee State Department of Health, has been selected to take charge of the new public health district recently created in Baltimore which was placed in operation on September 15.

DR. VERDO T. WEBB has been appointed Health Officer of Little Rock, Ark., succeeding Dr. Charles R. Moon, who resigned.

DR. WILLIAM T. SHORT, of Stonington, Ill., has been appointed District Health Superintendent of the Illinois State Department of Health. He succeeds Dr. Frank P. Auld, of Shelbyville.

DR. FRANK V. NEWCOMER succeeds the late Dr. Edward M. Boggess, of Elwood, Ind., as member of the Elwood City Board of Health.

DR. THOMAS J. MCKEAN, of Montpelier, was recently appointed to succeed the late Dr. Marion A. Emshwiller as Health Officer of Montpelier, Ind.

Dr. Joseph Myers, Health Officer of Albany, Ore., since 1918, resigned July 13. He is 93 years old.

CONFERENCES

October 3–7, Twenty-first Annual Safety Congress and Exposition, Washington, D. C.

October 13, 14, Eighth Annual Meeting, Missouri Water and Sewerage Conference, Sedalia, Mo.

October 14, 15, Health Conference, under the auspices of the School of Nursing of Hampton Institute, Hampton, Va.

October 21–23, International Society of Medical Health Officers, Washington, D. C.

October 21–25, American Association of School Physicians, Washington, D. C.

October 22–24, Conference of State Sanitary Engineers, Washington, D. C.

October 22–24, Institute on Health Education, Auspices of American Public Health Association, Washington, D.C.

October 22–25, Conference of State Sanitary Engineers, Washington, D.C.

October 23, State Laboratory Directors' Conference, Washington, D. C.

October 24–25, Association of Women in Public Health, Washington, D. C.

October 24–27, 61st Annual Meeting, American Public Health Association, Washington, D. C.

October 26, Health Council Executives, Washington, D. C.

October 27, National Conference of Social Work, Washington, D. C.

October 27–29, American Social Hygiene Association, Washington, D. C.

October 28–29, National Shell Fisheries Association and Oyster Growers and Dealers Association of North America, Inc., Washington, D. C.

November 6–11, Fifteenth Annual Convention, American Dietetic Association, New York, N. Y.

November 14–18, Tenth Annual Short School, Texas Public Health Association, Dallas, Tex.

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● The October number of the *Journal* contains articles on Bright's disease and nephritis, it discusses the care of the chronic patient and it will have an early report of the convention of the American Hospital Association.

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COMMUNITY HEALTH ORGANIZATION

Health workers who have used *Community Health Organization*, published in 1927 by the Committee on Administrative Practice of the American Public Health Association, will be interested to know that this book has been completely revised and rewritten. The work of revision has been handled by Professor Ira V. Hiscock, of the Yale School of Medicine, under the auspices and with the assistance of a committee consisting of Dr. Louis I. Dublin, Chairman, Dr. E. L. Bishop, Dr. Haven Emerson, Miss Sophie C. Nelson, and Dr. George T. Palmer. Many other public health workers have assisted, including Dr. W. S. Leathers, Dr. Joseph W. Mountin, and Mr. Leslie C. Frank, of the U. S. Public Health Service, Dr. H. R. Edwards, Dr. W. B. Soper, Dr. James A. Tobey, Miss Katharine Tucker, and Miss Alma Haupt, of the National Organization for Public Health Nursing, officers of sections of the American Public Health Association, Mr. and Mrs. E. G. Routzahn, of the Russell Sage Foundation, Dr. Kendall Emerson and Dr. H. E. Kleinschmidt, of the National Tuberculosis Association, Dr. W. F. Snow, of the American Social Hygiene Association, and Dr. W. F. Walker, of the Commonwealth Fund.

While the previous volume included plans of health organization for communities of different sizes, the present book of 18 chapters and 250 pages deals with only one plan, and suggests adaptations of details to meet varying conditions. A few chapters have been added to cover (a) community organization and the relationship of the health department to other governmental departments, (b) hospitals and health centers, (c) special problems including mental hygiene, industrial hygiene, cancer, and heart disease, (d) voluntary health and welfare agencies, and (e) costs of health work.

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